

# ROADS and STREETS

OCTOBER 1956

Gillert Publishing Co., 22 West Maple St.  
Chicago 18, Illinois

HIGHWAYS

A GILL

AIR FIELDS • HEAVY CONSTRUCTION

PUBLICATION

Accepted as Controlled Circulation  
Publication at Cedar Rapids, Iowa

UNIVERSITY MICROFILMS  
R6  
EUGENE B. POWER  
313 N. 1ST ST.  
ANN ARBOR, MICH.  
COMP-LRV-11-50

**CARBIDE  
INSERT?  
or  
MULTI-USE?**

**We get the lowest cost per foot-of-hole  
with TIMKEN® multi-use bits**

*... Reports McDowell and McDowell Construction Co.*



**LOCATION:** Industrial plant  
site, Nashville, Tenn.

**OPERATING CONDITIONS:**  
Medium hard limestone.

**D**RILLING through medium hard limestone on a 232-acre industrial plant site, McDowell and McDowell Construction Co. found they got the lowest cost per foot-of-hole with Timken® multi-use bits.

Under many drilling conditions you, too, can get the greatest saving with Timken multi-use bits. They will give you the lowest cost per foot-of-hole when full increments of steel can be drilled in ordinary ground.

But multi-use bits may not always be your best bet.

In hard abrasive ground, for instance, Timken carbide insert bits will give you higher speeds and greater economy. And for extremely deep holes, constant-gauge holes, or small diameter blast holes, Timken carbide insert bits are again your best bet.

Your drillers will save time with Timken rock bits—multi-use or carbide insert—because they're interchangeable in the same thread series. Dozens of Timken rock bits fit the same drill steel. Change them as fast as the ground changes.

And you get these extra advantages with all Timken rock bits: 1) they're made from the Timken Company's own electric furnace fine alloy steel; 2) they have the special shoulder union developed by the Timken Company to protect threads from drilling impacts.

Find out which Timken Rock Bit is best for your needs. Call or write the Timken Rock Bit Engineering Service, The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".



Timken threaded  
multi-use rock bit



Timken threaded  
carbide insert rock bit

**your best bet for the  
best bit for every job**

# TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.





OCTOBER 1956

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• AIR FIELDS • HEAVY CONSTRUCTION

Gillette Publishing Co., 23 West Maple St.  
Chicago 10, Illinois

A GILL

PUBLICATION

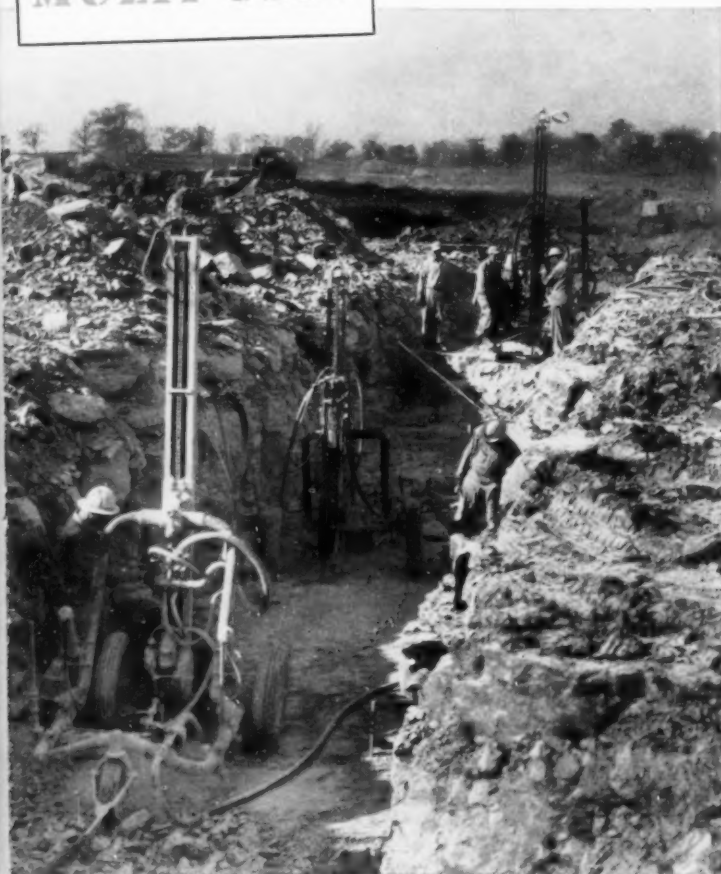
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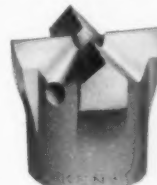
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Timken threaded  
multi-use rock bit



Timken threaded  
carbide insert rock bit

**your best bet for the  
best bit for every job**

# TIMKEN



*to complete the picture —  
...is yours a sharp enough pencil?*

Sharpen your pencils! That's the advice highway officials will give contractors and subcontractors bidding under the new federal-state highway construction program. Both Uncle Sam and his taxpaying nephews and nieces want the most for their money.

Profit attainment, therefore, becomes more than ever a question of efficient operation. In these days of high-powered machinery, Power is the big difference between efficiency and inefficiency. This explains the growing trend to Chrysler Industrial Power, the importance of Chrysler "end product-engineered" engines.

#### What Is A Chrysler "End Product-Engineered" Engine?

It is a complete heavy-duty power combination — engine plus acces-

sories — each component designed and engineered by Chrysler to fit the end product. A complete unit, it offers end product manufacturers and users all the advantages of one-stop sales and service.

Here are some typical examples of Chrysler End Product-Engineered Engines for the construction industry:

#### CONCRETE MIXERS—Engine plus

Mechanical or Velocity Governor  
Special Crankcase Ventilation System  
Heavy-Duty Air Cleaner  
gyrol Fluid Coupling  
3, 4 or 5-Speed Transmission  
Heavy-Duty Over Center Clutch and Power Takeoff  
LPG Carburetion System

#### FRONT-END LOADERS—Engine plus

Chrysler Industrial Torque Converter  
Heavy-Duty Over Center Clutch and Power Takeoff  
3, 4 or 5-Speed Transmission  
Engine-Driven Hydraulic Pump  
LPG Carburetion System

**SHOVELS, CRANES AND HOISTS—Engine plus**  
Heavy-Duty Over Center Clutch and Power Takeoff  
Chrysler Industrial Torque Converter  
Mechanical Governor  
LPG Carburetion System

#### ROAD ROLLERS—Engine plus

Chrysler Industrial Torque Converter With or Without  
Tail Shaft Governor  
gyrol Fluid Coupling  
Heavy-Duty Over Center Clutch and Power Takeoff  
3, 4 or 5-Speed Transmission  
LPG Carburetion System

Chrysler Industrial Engines and Power Units are end product-engineered for top-profit performance. Don't let power stall your efficiency... make sure your equipment is powered by Chrysler... 230 to 413 cubic inch displacement, in-line 6 and shortstroke V-8 engines. For full particulars see a Chrysler Industrial Engine Dealer, or write: Dept. 100, Industrial Engine Division, Chrysler Corp., Trenton, Michigan.

# CHRYSLER

# INDUSTRIAL ENGINES

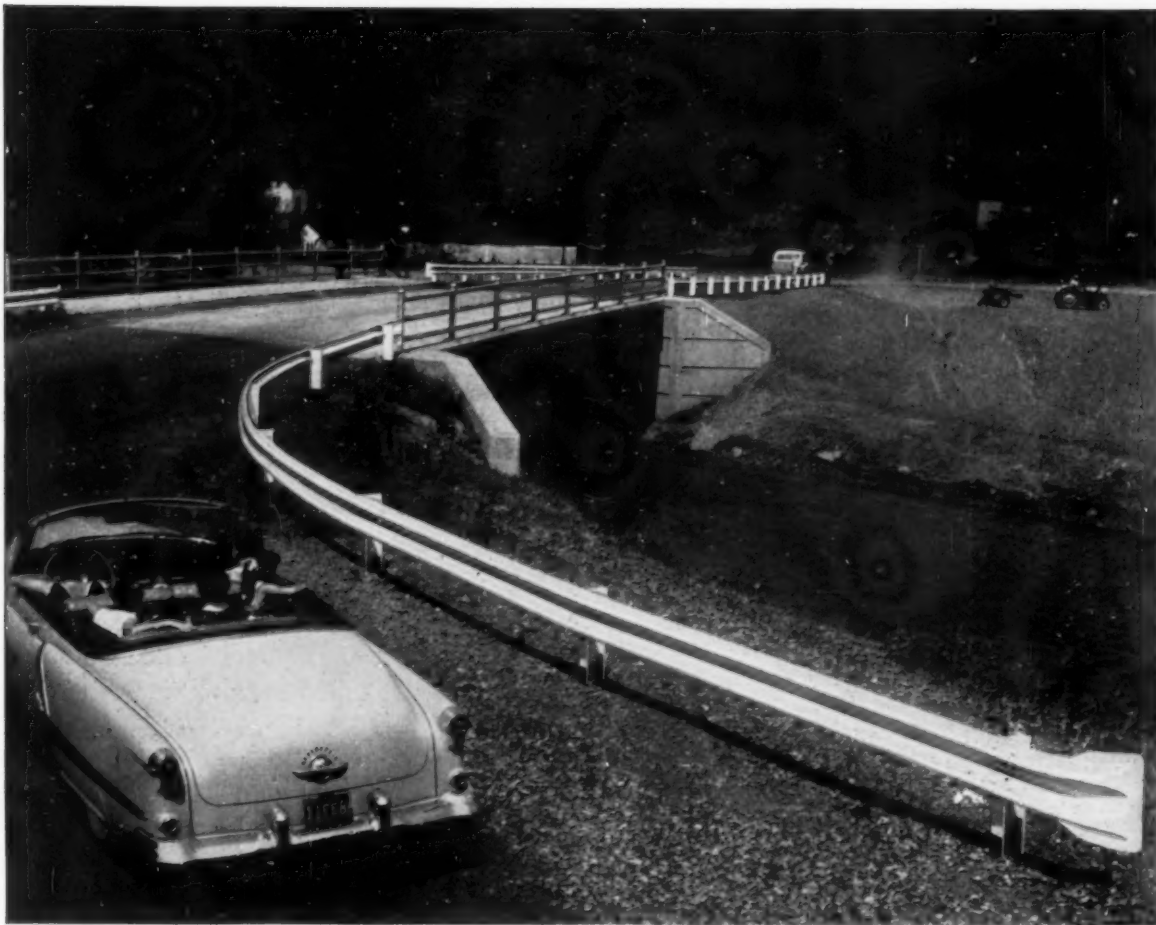
HORSEPOWER



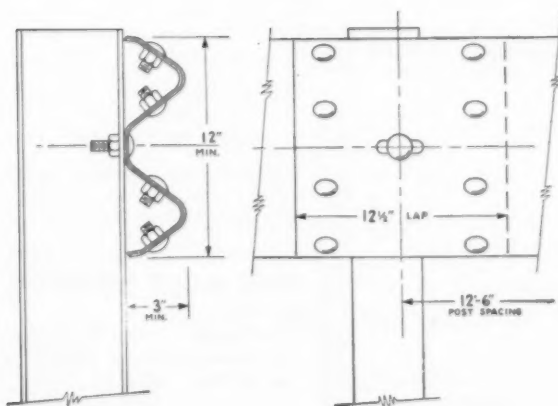
WITH A PEDIGREE

DIVISION OF CHRYSLER CORPORATION • TRENTON, MICHIGAN

... for more details circle 193, page 16



## For Safety at Highway Danger Spots Use Bethlehem Beam Guard Rail



Used at sharp turns, embankments and bridge approaches, Bethlehem Beam Guard Rail forms an effective and dependable service for today's high-speed traffic. At these danger spots, Bethlehem Beam Guard Rail has the strength to withstand considerable shock from a colliding vehicle, yet enough flexibility to re-direct the vehicle parallel to the rail.

Used as a highway divider, Bethlehem Beam Guard Rail helps to reduce accidents in respect to opposing streams of traffic.

Bethlehem Beam Guard Rail is made from 10- and 12-gage steel, bolted with a 12 1/2-in. overlap to make one continuous, impact-absorbing beam. It's easy to install and requires no anchor rods, special tools or complicated adjustments. Details and dimensions are illustrated here.

The nearest Bethlehem sales office will be glad to supply complete information on Bethlehem Beam Guard Rail.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.  
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

# BETHLEHEM STEEL



# ROADS AND STREETS

Sixty-Four Years of Editorial Leadership

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Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 63 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

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# 3 GENERATIONS BUILD

## WEST COAST CONSTRUCTION EMPIRE



**GOOD YEAR  
WAS THERE!**



Starting 76 years ago, as a small contractor, Adolph Teichert built the versatile organization that has what it takes to lick the big ones pictured above. Today, when you see a giant West Coast job—quarrying, earth-moving, road, rail bed, military base or dam building—it's a fair bet that A. Teichert & Son, Inc., have a hand in it! Earthmover shown above has Goodyear Hard Rock Rib tires on front wheels, Hard Rock Lug on rear.

### Now Goodyear "is there" with 3-T Nylon Cord Tires... TUBELESS or TUBE-TYPE

For well over 2 years, Goodyear Triple-Tempered 3-T NYLON CORD tires have been breaking records for stamina and endurance on the toughest jobs in our land.

And now your savings can be even greater—your tube and flap troubles ended forever—with Goodyear *tubeless* tires for every type vehicle *regardless of size!*

Leading equipment manufacturers have adopted Goodyear tubeless tires as standard—or will supply them as specified. Or you can convert your present equipment to Goodyear tubeless. Get the facts from your Goodyear dealer.

Goodyear, Truck Tire Dept., Akron 16, Ohio

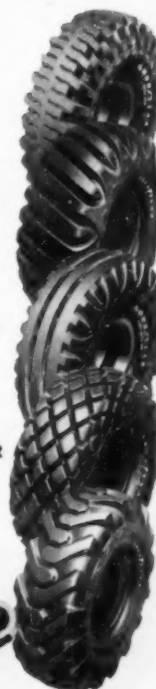
ROAD LUG

HARD ROCK  
LUG

HARD ROCK  
RIB

ALL-WEATHER

SURE-GRIP



Buy and Specify

FOR EACH JOB, THERE'S A COST-CUTTING GOODYEAR TIRE BUILT WITH 3-T NYLON CORD

# GOOD YEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Road Lug, All-Weather, Sure-Grip—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

... for more details circle 211, page 16

ROADS AND STREETS, October, 1956



Look for this sign:  
there's a Goodyear Dealer near you.

**SONOTUBE®** — formed  
36" I.D. concrete piers erect  
quickly . . . economically!



Piers for 15th Street Bridge, Allentown, Pa.  
E. A. Daylor Company, contractors.

# SONOTUBE®

## FIBRE FORMS

for round columns of concrete

The round concrete piers for this Allentown, Pa. bridge were formed by SONOTUBE Fibre Forms. These piers are 28-feet high and 36-inches in diameter.

Low-cost SONOTUBE Fibre Forms erect quickly because they handle easily and require minimum bracing. Use SONOTUBES for round concrete piers, columns and underpinning and save time, money and labor! Also an economical form for encasement of steel columns and steel and wooden piles.

Available in sizes from 2" to 48" I.D. up to 50' long. Can be ordered in specified lengths or sawed to your requirements on the job. Sonoco's patented "A-Coated" SONOTUBES are for finished columns; wax-coated also available. Order SONOTUBES for your next job!

For complete technical information and prices, write



**SONOCO**  
**PRODUCTS COMPANY**  
CONSTRUCTION PRODUCTS DIVISION

HARTSVILLE, S. C.

LOS ANGELES, CAL.  
8955 SOUTH WESTERN AVE.

MONTCLAIR, N. J.  
14 SOUTH PARK STREET

AKRON, IND. • LONGVIEW, TEXAS • BRANTFORD, ONT. • MEXICO, D. F.  
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## Meetings

AMERICAN SOCIETY OF CIVIL ENGINEERS  
— Fall Convention, William Penn  
Hotel, Pittsburgh, Pa.; Oct. 15-19.

NATIONAL SAFETY COUNCIL — 44th Annual  
Congress and Exposition, Conrad  
Hilton, Congress, Morrison and La  
Salle Hotels, Chicago, Ill.; Oct. 22-26.

AMERICAN CONCRETE INSTITUTE — 9th  
annual regional meeting, Sheraton-  
Mount Royal Hotel, Montreal, Can-  
ada; Oct. 24-25.

AMERICAN ASSOCIATION OF STATE HIGH-  
WAY OFFICIALS — Annual Meeting,  
Traymore Hotel, Atlantic City, N.J.;  
Nov. 27-30.

HIGHWAY RESEARCH BOARD — Annual  
Meeting, Sheraton-Park Hotel, Wash-  
ington, D.C.; January 7 to 11, 1957.

ASSOCIATED EQUIPMENT DISTRIBUTORS —  
38th Annual Meeting, Conrad Hilton  
Hotel, Chicago, Ill.; Jan. 27-30, 1957.

AMERICAN ROAD BUILDERS' ASSOCIATION  
— Road Show and 55th Annual Con-  
vention, Amphitheatre, Chicago, Ill.;  
Jan. 28-Feb. 2, 1957.

NATIONAL BITUMINOUS CONCRETE ASSO-  
CIATION, Inc. Annual Convention, Con-  
rad Hilton Hotel, Chicago, Illinois;  
January 31 — February 2, 1957.

ASSOCIATED GENERAL CONTRACTORS OF  
AMERICA, Inc. — Annual Meeting,  
Statler Hotel, Washington, D.C.;  
March 11-14, 1957.

## 150-Mile highway program in Liberia

A new 150-mile highway will be constructed into the interior of Liberia, near the French West African border. The project is financed by \$20,000,000 of credit extended under an Export-Import Bank loan agreement.

The U.S. Bureau of Public Roads has set up a district office in Monrovia, the capitol city, with L. Sterling Hedgpeth as district engineer. In addition, Mr. Hedgpeth will serve as a technical aid in the program of the International Cooperation Administration and will serve as a consulting engineer to the Government of Liberia.

Brown and Blauvelt, consulting engineers of New York City, have been appointed to handle the engineering for this highway which will be of the secondary type made of locally available compacted materials and penetrating tropical jungle. James Hoban is project manager.



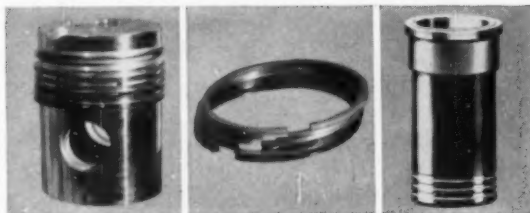
Somebody mention replacing a piston? Remember...

Caterpillar pistons are of special aluminum alloy—light, yet extremely heat-resistant and strong. CAT\* rings are cast from fine grain alloy iron; their honed sides and lapped faces mean better sealing, smoother break-in. Chrome-plated rings offer increased resistance to wear. And 21 complete quality-control checks insure the fit, performance and long life of each Cat liner. You're sure of top quality, throughout.

With substitute parts, can you be sure of anything?

**Better see your Caterpillar Dealer's Parts Representative—and get Cat original parts every time.**

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.



Cat pistons, rings and liners are the result of years of Caterpillar experience and research. Their thousands of trouble-free working hours can cut your operating costs substantially. Why take a chance with substitutes?

# CATERPILLAR\*

\*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



... for more details circle 188, page 16

# Why Marfak gives better, longer-lasting bearing protection

**THE REASON** lies in *Texaco Marfak's* unique "sealing-in" action. *Marfak stays in* chassis bearings, even under heavy shock loads on rugged terrain—forming an effective seal against dust and dirt, preventing rust. And *Marfak's* tough lubricating film keeps wear at a minimum. Results—longer life for all parts, lower maintenance costs.

*Texaco Marfak Heavy Duty* does the same outstanding job in wheel bearings. It shuts out dirt and mud, assures safer braking and extra thousands of miles between lube jobs. No seasonal change is needed.

If you prefer a multi-purpose lubricant for chassis, wheel bearing, water pump and other grease lubrication — new, lithium-base *Texaco Marfak*

*Heavy Duty Special 2* is your answer.

**More than 625 million pounds of Texaco Marfak have been sold.**

Here are two more Texaco names to remember: *Texaco Track Roll Lubricant* for smoother-working, fully protected crawler mechanisms; *Texaco Universal Gear Lubricant EP* to assure more dependable, lower-cost performance from differentials and transmissions.

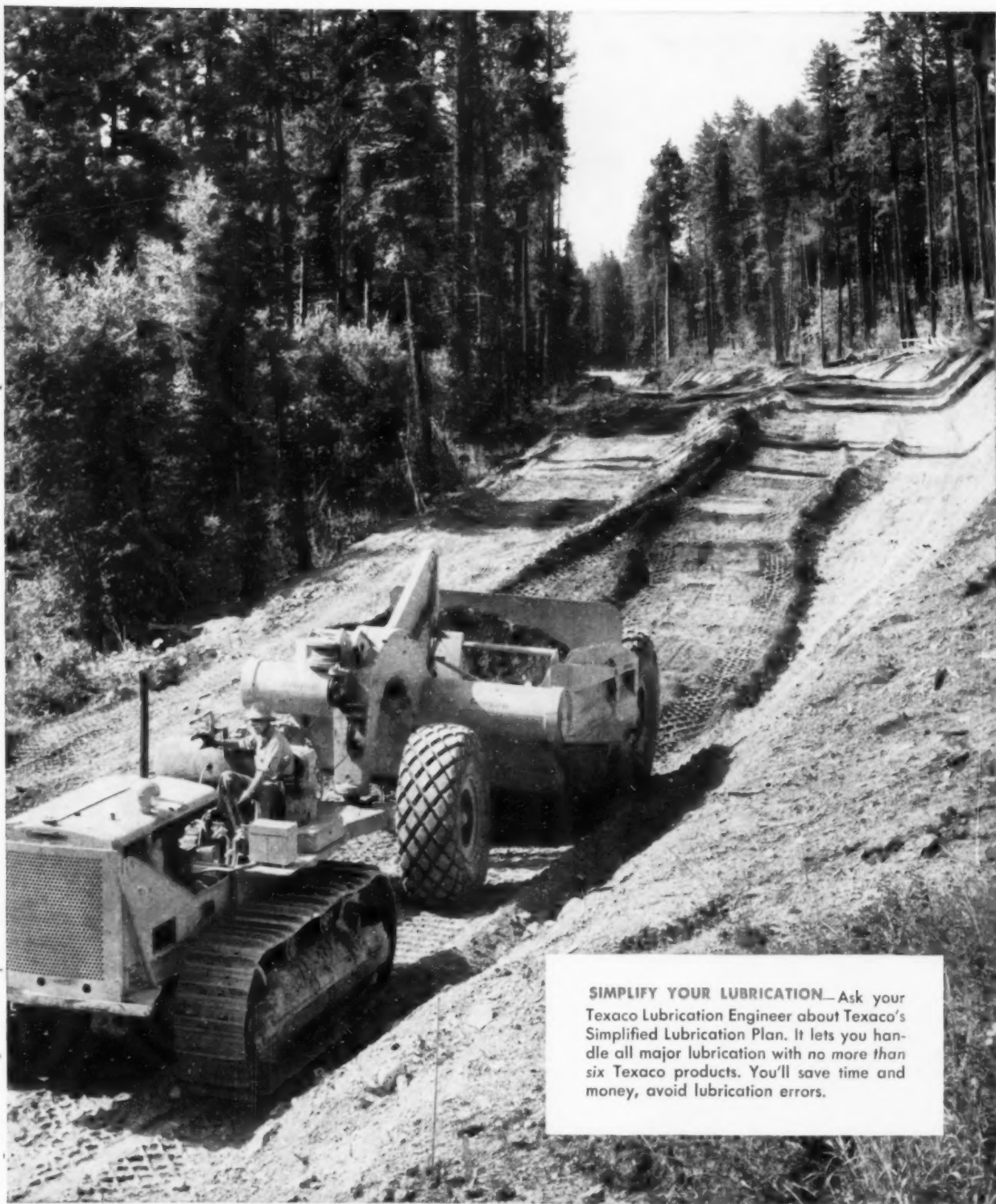
Get the full story on cost-cutting Texaco lubricants from a Texaco Lubrication Engineer. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



# TEXACO





**SIMPLIFY YOUR LUBRICATION**—Ask your Texaco Lubrication Engineer about Texaco's Simplified Lubrication Plan. It lets you handle all major lubrication with no more than six Texaco products. You'll save time and money, avoid lubrication errors.

# Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

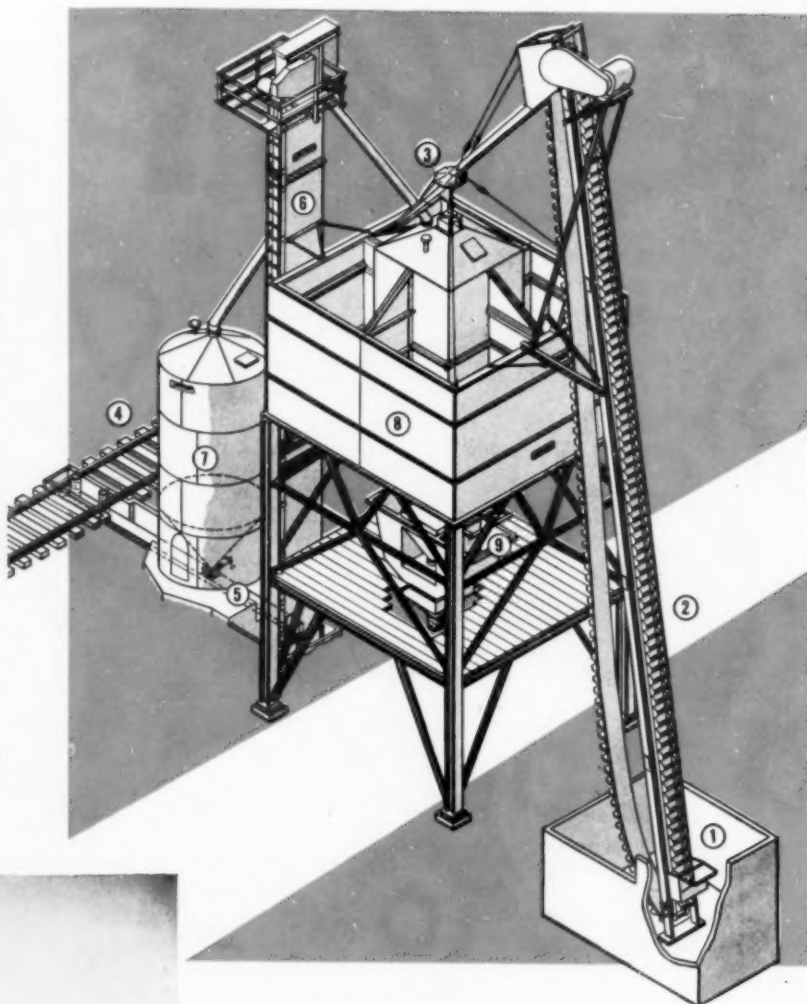
... for more details circle 261, page 16

**ROADS AND STREETS, October, 1956**

## TAKE A QUICK "TOUR" through this Johnson concrete plant:

As you follow the flow of aggregates and cement through this Johnson "one-stop" plant, notice how every operation from receiving of materials to final weigh-out, is carefully coordinated for fast, accurate production:

- 1 Set up here for truck delivery of aggregates, plant has 5 cu. yd. receiving hopper attached to elevator boot.
- 2 Open, inclined belt-and-bucket elevator feeds aggregates into overhead chute at rate of 90 tons an hour.
- 3 Pivoted distributor (manually controlled from ground-level) directs flow of aggregates into proper bin compartment.
- 4 Canvas shrouds with car-adaptor plates unload bulk cement from hopper-bottom cars at rail siding.
- 5 Undertrack screw conveyor receives cement from rail cars, or ground storage silo, and transfers it to elevator at rate of 275 bbls. per hour.
- 6 Vertical, enclosed bucket elevator with 2-way discharge gate directs cement into dual-compartment central tank in bin or to auxiliary ground-storage silo. Gate is cable-controlled from ground. Elevator capacity: 275 bbls. per hour.
- 7 Cement silo has 470-bbl. capacity. Cement rotary plug valve at cone bottom controls flow of reclaimed cement.



8 Johnson prefabricated square bin has a centrally-located 270-bbl. water-tight cement tank, and can be arranged with 4, 5 or 6 aggregate compartments. Total aggregate capacity is 210 cu. yds.

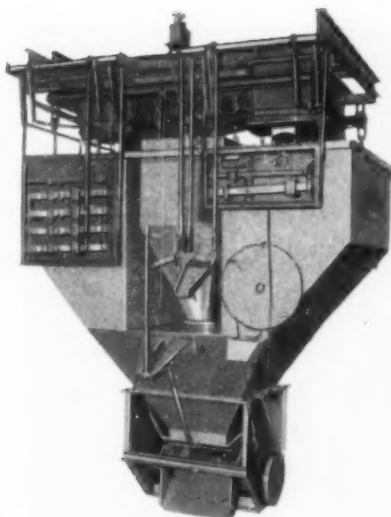
9 Square type Concentric Multiple batcher weighs cement on a separate scale. It can be arranged for handling 4, 5 or 6 aggregates, plus 1 or 2 types of cement — has total capacity of 3 cu. yds.

Note unique bin assembly, which consists of individual, welded sections laid together like blocks, and bolted together. Bin sections do not exceed 11' x 11' x 21' for ease in handling and shipment. Total capacities: 125 to 300 cu. yds. In addition to transit-mix, this plant readily sets up for central-mix or concrete products — manual or push-button control. Want more facts? See Johnson distributor, or write us for 44-page catalog.



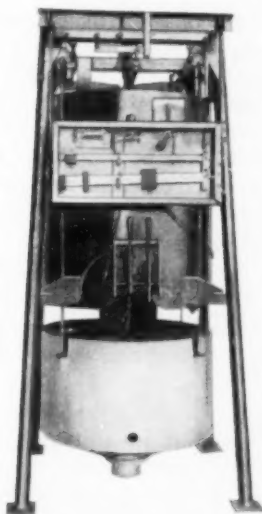
**C. S. JOHNSON COMPANY**

CHAMPAIGN, ILLINOIS • (Koehring Subsidiary) C1634



### Central cement-feed with Concentric Batcher

In this exclusive Johnson batcher, aggregates are arranged concentrically around cement. Prevents "gumming", reduces dusting, preshrinks materials. Cement is weighed on separate scale; aggregates on accumulative dial scale or on individual beam scales. Sizes from 2 to 8 yds., arranged for 2 to 8 aggregates and 1 to 4 cements. Manual, semi- or full-automatic operation.



### Johnson Water Batcher

assures close quality control of concrete. Accuracy is not affected by changes in water temperature. 2 sizes: 120 gals. (1,000 lbs.) for batches up to 3 yds. — and 240 gals. (2,000 lbs.) for batches up to 6 yds. Semi- or full-automatic.

### NEW small, compact Parsons Trenchliner®

Working height is only 7 feet-4 inches on this new Parsons 155. Width over crawlers is 5 feet-4 inches for work and travel in crowded areas. Yet, there's plenty of work capacity. It digs from 5.8 in. to 25 feet per minute — 16 to 26 in. wide, 10 feet deep. Down-crowd boom is hydraulically controlled. Also has: "Tap-In" teeth, power-shift conveyor, grouser-type treads or flat shoes. (4 other Parsons models in all sizes and types.)

PARSONS • Newton, Iowa  
(Koehring Subsidiary)



### Light-weight fork lift has ½-ton load capacity

Kwik-Mix S-10 Moto-Bug® with fork lift weighs only 1575 lbs., works over light ramps, scaffolds, floors where heavier lift trucks can't safely travel. It lifts ½-ton load up to 6-foot height. Forks are 20 or 30 inches long, and adjustable from 6 to 32 inches wide. Tilting mast optional. Fork lift is interchangeable with 10 or 15 cu. ft. hopper, ¾-ton platform. Bigger Moto-Bug available; also concrete, plaster-mortar and bituminous mixers.

KWIK-MIX • Port Washington, Wis.  
(Koehring Subsidiary)



### 1-second gravity-dump speeds haul cycles

There's no waiting for slow-acting body-hoists on this job. Koehring Dumptor drives up, body forward — operator trips the body-release lever, and gravity dumps the 6-yard load instantly. Cuts 15 to 25 seconds off cycle-time. And, gravity-dump never balks — never wears out. There's no expensive hoist maintenance, replacement parts, or hoist down-time when you haul with Dumptors®. Better check what this can mean on your work.

KOEHRING Company  
Milwaukee, Wis.

V66 REV2



... for more details circle 230, page 16



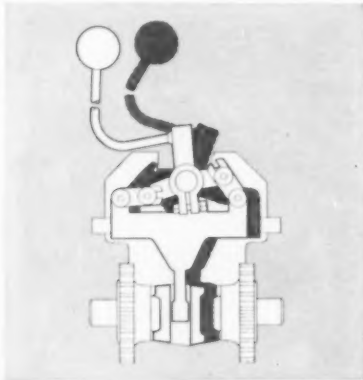
## Report from the Dallas-Fort Worth Turnpike Job



*"The Allis-Chalmers Forty Five motor grader has the*

### **BEST CONTROLS I'VE EVER TOUCHED"**

That's what veteran motor grader operator R. C. Fryer of Telephone, Texas, says about the new mechanical, toggle-type control levers on the Allis-Chalmers Forty Five motor grader he is operating for the J. C. Watson Construction Co., Dallas, Texas.



**FORTY FIVE**  
120 brake hp • 23,800 lb

And here's why Fryer is so enthusiastic. Toggle-type controls move gears into operating position surely, quickly when operator moves lever . . . but with *no* wrist-snapping kick-back. Levers stay put—can't fight back. With no backlash to worry about, Fryer does precision jobs faster and easier.

#### **You've got to see it to believe it**

R. C. Fryer is a veteran of the four-mule Fresno days, and his enthusiasm is proof that the Forty Five is motor grader news worth looking into. Check and you'll find toggle-type controls are only one of many features that mean new performance and new operating ease.

The big Allis-Chalmers diesel

engine provides real lugging ability. The ROLL-AWAY moldboard rolls the load instead of pushing it . . . moves it faster with less effort. Fully enclosed power steering, new accelerator-decelerator pedal, real operator comfort, excellent visibility, all add up to the kind of production and long-life service you want.

See the Forty Five. Try the Forty Five. Find out for yourself the many advantages that will help you get top performance and big production on your jobs.

Your Allis-Chalmers dealer has complete facilities to serve you—factory-trained sales and service personnel, factory-approved service equipment and complete stocks of True Original Parts.

ROLL-AWAY is an Allis-Chalmers trademark.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

## **ALLIS-CHALMERS**



. . . for more details circle 178, page 16

**ROADS AND STREETS, October, 1956**



engineered by  
"pessimists"



As anyone in the construction business knows, it's just good sense to "expect the worst and you won't be disappointed." That's why we stress the fact that the rated capacities of Dorsey Heavy-duty trailers are always conservative, providing a margin of safety against adverse conditions. Our engineers realize the serious losses that can result from failure of equipment that hauls construction machinery.

We invite close scrutiny of all Dorsey specifications: Dimensions of main beams and all other structural members will show any engineer that Dorseys are built "with trouble in mind."

Note, too, that Dorseys come complete with lights, brakes and other items needed for highway use, and tires are full-sized for capacity loads.

#### MODEL HTS LOW BED

20 Ton capacity — Weighs Only 8,250 pounds  
(Also available in 15, 25, 30, 35 ton capacities)  
Although as much as a ton lighter than other trailers of comparable capacity, high-tensile steel main channels and close-spaced all-welded cross members give the HTS superior strength and ruggedness. Flat gooseneck provides support for blades and other loads.



#### NEW SELF-LOADING FLOAT

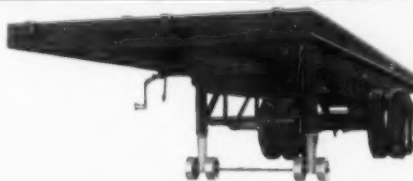
This trailer will actually carry 45,000 pounds concentrated in 10 feet of its length! The secret is the extra-deep high-tensile steel main frame that we "tailor" to length and load requirements:

14 inches deep on floats 28 through 31 feet.  
16 inches deep for lengths through 35 feet.

#### THE GIANT PLATFORM

44,000 lb. capacity — Weight: 8,410 lbs.

In the year since its introduction, the Giant, with its 18-inch-deep main frame, has become America's No. 1 platform! Although as much as 2,000 lbs. lighter than other platforms, it has even greater strength.



#### TANDEM TILT-TO-LOAD

15,000 and 20,000 capacities — Weights: 2,500 and 2,700 lbs.

Speed and efficiency as well as economy are combined in this versatile tilt model: it's so light a dump truck pulls it easily. Two-way hydraulic control is so precisely balanced the weight of a man will tilt it up or down. Single axle models also available.



For the complete facts on any model  
heavy-duty trailer, see your Dorsey  
Distributor — or wire collect.

**DORSEY TRAILERS / ELBA, ALABAMA**

... for more details circle 200, page 16

ROADS AND STREETS, October, 1956



***New TDA<sup>®</sup> lightweight***  
**8,500 EXTRA TON-MILES**



WHAT'S NEW

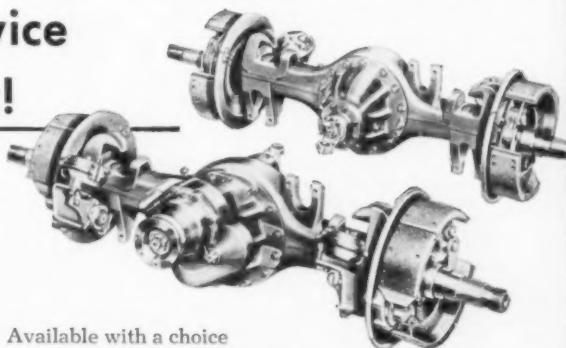
# *highway tandem gives* **PAYLOAD A YEAR\***

**...built almost entirely from interchangeable standard axle parts for easier service and lower parts inventory!**

This new lightweight tandem brings two important new advantages to construction truckers—greater payload capacity† and much easier maintenance.

More than two hundred pounds lighter than any other unit of the same capacity, this new TDA tandem will save a trucker 8,500 deadweight ton-miles during an average 75,000 mile year. This means more payload and profit where it counts.

Almost all of the parts—gears, pinions, differentials and brakes—used in this new tandem are interchangeable with parts from Timken-Detroit® standard single axles. This assures operators less down time . . . faster, simpler, more economical service . . . and smaller replacement parts inventory.



Available with a choice of either Timken-Detroit axle connecting groups, or brackets to accept other approved chassis hook-up parts. Plus these additional advantages with the Timken® lightweight tandem:

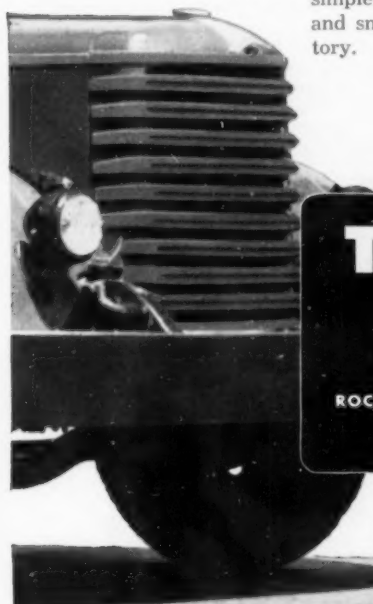
**TDA Inter-Axle Differential Divides Torque Evenly Between Axles** . . . and yet permits wheels of one axle to revolve faster or slower than wheels of the other axle. This means both axles are always doing equal amounts of work . . . driving parts and tires last longer.

**Driver-Controlled Lockout**—with TDA inter-axle differential, the driver can obtain the advantages of straight-through drive under slick or icy conditions by locking out the differential at *any* driving speed.

**Big, Dependable Hypoid Gears** rotate in conventional direction for maximum gear and bearing life.

This new highway tandem insures new payload profits, faster, easier service and operating economies for construction truckers everywhere. For complete information contact your nearest vehicle dealer or branch.

\*based on 75,000 highway miles a year.  
†for the same gross vehicle weight.



**TIMKEN**  
*Detroit*  
**AXLES**

TIMKEN-DETROIT AXLE DIVISION  
**ROCKWELL SPRING AND AXLE COMPANY**  
DETROIT 32, MICHIGAN



TRADE MARK REGISTERED

**World's Largest Manufacturer of Axles for Trucks, Buses and Trailers**

Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York  
Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

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# WHAT'S NEW in Equipment and Materials

## Plastic Cover for Pick-Up Trucks

A rugged plastic truck cover that will convert an open-bed pick-up truck to a weatherproof panel model in a matter of minutes is now being marketed by Glas Laminates, Inc., 1979 Harbor Blvd., Costa Mesa, Calif. Designed to fit  $\frac{1}{2}$  or  $\frac{3}{4}$  ton trucks, the one-piece cover effectively seals out rain and dust, is extremely resistant to physical shock and temperature change. The basic unit is molded from glass fiber reinforced Plaskon polyester resin supplied by Barrett Division, Allied Chemical & Dye Corp.

For more information circle 101 on Service Coupon this page and mail now.

## Telescopic Hoist Cylinders

A new line of telescopic hoist cylinders, for use in Galion's Uni-scope and Duo-scope hoists, announced by Galion All-steel Body Co., Galion, O., features seamless alloy steel sleeves with ground and polished surfaces, said to provide leak-free operation and long seal life. According to the manufacturer, the self-adjusting chevron seals are protected from damage by molded wiper rings located above each seal assembly. Extra-long bronze guides at top and bottom of each sleeve are reputed to assure rigidity of the cylinder throughout its entire stroke length. Threaded construction of sleeve rings and guides is claimed to facilitate servicing.

Available with lifting capacities from

20,000 to 68,000 lb., Galion telescopic cylinders are offered in a variety of sizes to suit individual application requirements. Cylinder diameter ranges from 5 to 8 in., with 3 to 6 stages and 60 to 128 in. stroke lengths.

For more information circle 102 on Service Coupon this page and mail now.

## Front-Wheel Locking Hub Gates

Front-wheel locking hub sets and attaching parts are now available for three four-wheel-drive International trucks in the light and medium-duty fields. These are the International models S-120 (4x4), S-140 (4x4), and S-160 (4x4).

The manually operated locking hubs are stated to provide for greater fuel economy, better truck performance with less engine load, easier steering, reduced vibration and cab noise, and longer tire life. Providing a means of controlling engagement of the transmission of full power to both wheels when engaged. When disengaged, with the front axle not driving, they permit front wheels to "free wheel" while the axle shafts and differential gears remain idle, saving unnecessary wear.

For more information circle 103 on Service Coupon this page and mail now.

## Winch for International Truck

A factory mounted front winch of 6,000 lb. nominal capacity has been made available for the light-duty, four-

wheel-drive International model S-120 (4x4) truck by International Harvester Co.

Cable capacity of the winch is 375 ft. of  $\frac{1}{2}$ -in. or 270 ft. of  $\frac{5}{16}$ -in. cable.

The winch is driven from the left side of the T-10 transmission of the truck by a one-speed forward and one-speed reverse side-mounted transmission power take-off. The power take-off is controlled from the cab.

For more information circle 104 on Service Coupon this page and mail now.

## Aluminum Wheel for Trucks

The nation's first forged disc aluminum wheel for tubeless truck tires has been placed on the market by Aluminum Company of America, Pittsburgh 19, Pa. The one-piece leakproof construction of the new 22.5 in. x 7.50 in. wheel retains all present aluminum advantages in a design offering complete compatibility with tubeless tires. Combining round and true rims with high thermal conductivity, aluminum wheels are stated to provide easier steering, smoother riding and lower maintenance costs, coupled with the assurance of cooler running and longer lasting tires. Payloads are liked because of the lighter unsprung weight.

For more information circle 105 on Service Coupon this page and mail now.

## More equipment news page 100

## MAIL THIS COUPON TODAY!

**ROADS & STREETS**  
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Please send me further information on products and materials mentioned in the October Roads & Streets as circled below

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NOT GOOD AFTER NOVEMBER 15, 1956

## Faster Drilling Speeds for Le Roi Drill

A faster, stronger rotation, resulting in increased drilling speeds and hole footage, has been achieved in the Le Roi-Cleveland H-10 sinker drill, according to the manufacturer. The Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis., announced the modification and its adaptation to former manufactured models of its H-10 drill.

The changes incorporate the use of a new valve, the type used in the H10AL air leg drill manufactured by the firm for use in the mining industry.

By increasing the metering limits of the valve and the valve block, fast drilling speeds are stated to be possible in both hard and soft formations due to the extremely short travel of the valve. The new valve and valve block are interchangeable with those previously used in the H-10 sinker drill.

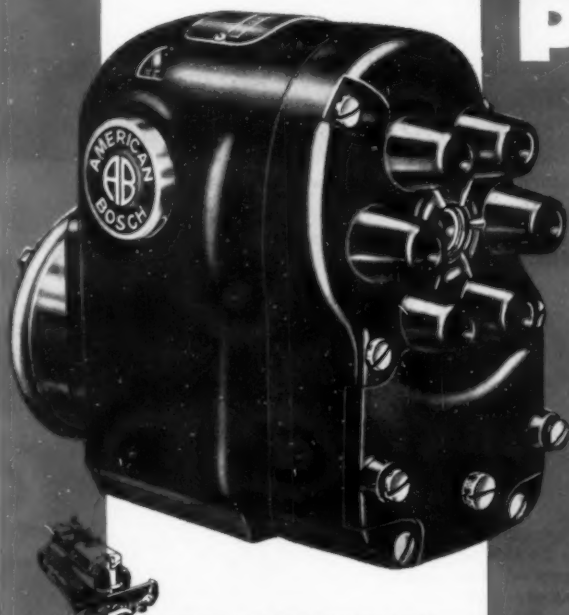
For more information circle 106 on Service Coupon this page and mail now.

For more items . . . see page 100

## A READER SERVICE FOR YOUR NEEDS



Right from the start . . .



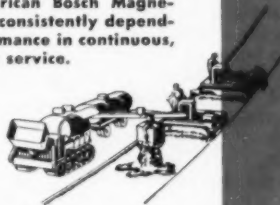
**POWERFUL**



## AMERICAN BOSCH MAGNETOS

### FOR CONSTRUCTION INDUSTRY SPARK IGNITED ENGINES

In dozers, gas-engine driven compressors, pumps, graders, paving machines and spreaders . . . wherever they are in use in Construction equipment engines, American Bosch Magneto deliver consistently dependable performance in continuous, heavy duty service.



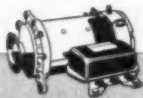
Fast, powerful — that's the power-packed story of American Bosch Magneto — today's finest ignition units for construction industry engines. Many advanced features give these famous Magnetos greater power for split-second starting, PLUS the built-in stamina that assures years of constant, trouble-free service in construction engines. That's why they're so widely used as original equipment by so many leading engine builders.

For your every replacement need, there's an American Bosch Magneto precisely engineered for maximum efficiency at all operating speeds and loads. Moreover, American Bosch can serve you well with all the advantages of one of the world's largest and most efficient Service organizations. There's an AB Service Agency near you. Write today for application data on your largest heavy duty engines right down to today's compact, high-speed power units. American Bosch, Springfield 7, Mass. A Division of American Bosch Arma Corporation.

# AMERICAN BOSCH



Automotive and  
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Generators and  
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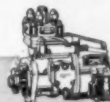
Components for  
Aircraft Engines



Small  
Electric Motors



Electric  
Windshield Wipers



Diesel Fuel  
Injection Equipment

. . . for more details circles 179, page 16

ROADS AND STREETS, October, 1956



The Universal 293QS on a road construction site west of Tremonton, Utah, 1955.

## The Universal 293QS TwinDual Gravel King has "Increased our pay load by 33⅓%, lowered operating costs 10c per ton"

*Says Jed R. Abbott of Germer, Abbott & Waldron Construction Company, Tremonton, Utah*

Abbott's company saved \$20,000 on its first large order for aggregate produced by the Universal 293QS.

"After turning out 200,000 tons of



### More than a gravel producer

The 293QS is the most versatile machine on the market—two plants in one! Inquire how you can convert it quickly from gravel to crushed stone production and back again.

material for U.S. Highway 91 last year," said Abbott, "this is the most economical plant we've ever operated. Our payload is a third more and our costs were ten cents a ton less than with other crushing equipment.

"On the Highway 91 job, it took three D-8 Cat dozers and a scraper to feed the 293QS. The plant we were using before required only one D-8. That'll give you an idea of the difference in capacity."

You'll have a story to be proud of, too, when you work with the Universal 293QS. Producers are enthusiastic about the ability of this plant to make up for lost time. As Jed Abbott puts it, "The severity of Utah weather could mean the loss of much production, but with the Universal 293QS we have the capacity to fill larger orders, fill them faster, charge less and make more money in the long run."

Nearly everyone, like Germer, Abbott and Waldron, goes through seasonal or other costly shut-downs. Costly, that is, unless like Germer, Abbott & Waldron,



### Volume production through improved design

Finished material on final belt. Exclusive Universal TwinDual roll crusher permits up to 100% wider discharge opening of the extra-large primary jaw crusher. Jaw efficiency increased by pre-screening pit-run material before entering crusher.

you've discovered crushing equipment like the Universal 293QS — designed to recapture time lost — at a profit!

Write for complete facts on the Universal 293QS Gravel King now.



## UNIVERSAL ENGINEERING CORPORATION

631 C Avenue, N.W., Cedar Rapids, Iowa

Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois

... for more details circle 268, page 16

## ROADS AND STREETS

Sixty-Four Years of Editorial Leadership

# Washington News Letter



By Duane L. Cronk

October 10, 1956

The pattern for engineering design and construction of new airports to handle jet plane traffic is emerging after months of speculation. In Washington last month, a Civil Aeronautics Administration official forecast some features of the airport of the future.

Airport runways will not necessarily be longer to accommodate jet planes, James T. Pyle, CAA administrator, predicted last month. Except for long trans-ocean traffic, most "jet transports will be able to accommodate themselves to the runways now existing at the larger municipal airports," Mr. Pyle said.

It may be necessary to thicken the pavement of some runways, but, again, Mr. Pyle pointed out, major renovations are not in the book. "The runway problem, from a load-bearing standpoint, does not present us with any immediate crisis." The CAA also believes that neither the jet blast nor occasional fuel spillage associated with operation of the new planes "is going to do any great amount of damage." But, the hazard of foreign objects, such as stones and bits of metal, sucked into jet engines, has necessitated the development of large mobile vacuum runway cleaners.

\* \* \*

State highway officials have found that one of their toughest chores is to "sell" local businessmen on the advantages of a bypass around their city instead of straight through. Last month the U.S. Chamber of Commerce came to the rescue with some powerful ammunition in favor of such new relief routes. Citing the results of a nation-wide survey, the Chamber declared that construction of a bypass usually stimulates downtown business, boosts property values, reduces pedestrian accidents and eases parking.

The Chamber backs its sentiments with facts from numerous sources, including nine California cities where new bypasses have boosted downtown shopping by as much as 132%. (Single copies of the study, "How Bypasses Affect Business," may be obtained from the U.S. Chamber of Commerce, Washington 6, D.C., for 50¢.)

This national business organization is carrying this message to its businessmen members around the country through a series of regional highway conferences. The first was held in Columbus, Ohio, last month. Others are already scheduled for Boston and Oklahoma City.

(continued on next page)

Highway expenditures will hit \$8.2 billion this year, the Bureau of Public Roads estimated last month. More than \$5.5 billion of this will go for construction of roads and streets, the balance for maintenance, administration and interest. This compares with \$7.2 billion for 1955. Meanwhile, highway receipts will exceed \$8.7 billion, or \$1.5 billion more than in 1955. These figures do not reflect initial costs of the big, new National Highway Program for which spending is not yet really under way.

A forecast of highway construction volume over the next 13 years has been made by the American Road Builders' Association. ARBA predicted last month that road construction will top \$6.8 billion in 1957, \$7.3 billion in 1958 and \$7.8 billion in 1959. The association foresees a peak of \$8 billion a year by 1960 and believes that that level will be held for about eight years.

\* \* \*

Highway construction and maintenance costs are on the way up. For the second quarter of 1956, construction costs were 7.8% higher than for the same period a year ago. Rising material and labor costs account for much of the increase

Equipment costs are on the upswing, too. The Bureau of Labor Statistics reported last month that construction machinery prices jumped 9.8% on the average during the 12 months ending in July.

\* \* \*

Toll road financing is fading out, Washington officials are predicting, as a result of Uncle Sam's contribution of 90% of the cost of new Interstate System routes. Around the country, they say, toll authorities will soon be going out of business and projects originally scheduled as toll projects will be "free" roads instead. Reports are that Ohio has cancelled its proposed north-south turnpike as a toll road; Oklahoma will not toll-finance a highway from Oklahoma City to the Kansas state line; New Jersey is shelving a \$25-million bond offering for the Garden State Parkway; New York has deferred sale of \$50 million worth of Thruway bonds, and Illinois toll road bonds which sold at par last October have slipped in price.

In Washington, however, a top federal official argued that the new highway program will not lessen traffic on toll roads or endanger the value of toll road bonds. Louis S. Rothschild, Under Secretary of Commerce for Transportation, declared that he does not believe "there is any reason whatever" for the fear that the National Highway Program will have an adverse affect on the bonds of toll turnpikes. He pointed out that such roads will be integrated into the Interstate System, wherever possible.



## **Contractors Appraise Shortages In Manpower, Materials and State Money**

A Special Roads and Streets Staff Report

Facing up to the problems involved in getting the big National Highway Program under way, leading contractors at the Associated General Contractors of America, Inc., annual board meeting in Milwaukee last month raised a host of questions.

- "How long will we have to wrestle with materials shortages?"
- "Is there any relief in sight from the shortage of engineers?"
- "Can the states match the increased federal aid?"

They got some blunt answers — from highway officials, from their national headquarters and from each other. The AGC, a powerful and effective association whose membership represents the collective strength of the contracting industry, whose task it will be to translate the new federal road dollars into actual pavement. For that reason, discussion at the AGC's Milwaukee meeting drew national attention.

\* \* \*

There was considerable uncertainty about the materials supply situation. Contractors reported serious difficulty in obtaining steel, with waits of up to 2½ years for specially fabricated shapes. Highway session chairman, Edward O. Earl told the gathering candidly that the steel shortage would continue to be very serious "for some time." State highway departments are finding ways around the problem. Some are stocking H-piling. California, reportedly, is lending piling to contractors on a returnable basis. Others are converting to prestressed concrete design. The contractors restated their desire to continue to purchase all materials required for a job.

Some states will be hard-pressed to provide money to match the increased federal aid, contractors reported. It is apparent that the good roads drive must continue at the state level. Many will need to float bond issues, and industry support must be enlisted if they are to succeed, the contractors agreed.

\* \* \*

The most immediate bottleneck in the National Highway Program is already proving to be the shortage of civil engineers, many in attendance reported. In this area, the meeting indicated, contractors around the country are beginning to see the various roles they must play.

● Summer training experience — C. J. Carroll, executive secretary of the Michigan Road Builders Association, described how Michigan contractors are co-sponsoring a summer training program for highway engineering aides. The unusual eight-week field course, worked out by the University of Michigan and the Michigan State Highway Department, is designed to give high school graduates an inkling of highway engineering. The contractors' association puts up \$150 per student. Mr. Carroll reported that 172 men have taken the course. Half of them have remained in the employ of the highway department; most of the rest have gone on to engineering colleges.

● Scholarships — A number of state contractors' associations make scholarship awards regularly to deserving engineer students. These are usually for about \$500. Some chapters contribute as much as \$4,000 in this way to get more young men into engineering. (Illinois contractors award two four-year, \$4,000 scholarships in highway engineering each year.)

● Recruiting — Some chapters reported increased activity in encouraging young men to make engineering their career. The New York State chapter of the AGC, for example, sent out 3,500 letters to high school graduates whom they felt were potential engineers, pointing out the need for highway engineers. In addition, they have produced 1,200 posters for high school bulletin boards and are publishing an informational booklet on the opportunities in highway engineering for distribution to high school students.

The contractors own stake in engineering was revealed in an AGC survey which found that the association's 6,700 member firms (of which some 3,500 do some road work) presently employ more than 32,000 engineers. The contractors indicated that within the next 3 years they will have need for 13,000 more or in the next five years, 20,000 more.

\* \* \*

The contractors heard reports of progress in other areas — accident prevention, labor and governmental relations.

● The number of contractor firms participating in the association's safety program has doubled in the last two years Harry Kirk, AGC safety director reported. "If we don't get going on accident prevention programs of our own, some one else is going to tell what to do and how to do it!" Mr. Kirk warned.

● Contractors must be alert to protect their interests in federal wage determination cases, William Dunn, AGC assistant executive director, told the meeting. "The Department of Labor is being most objective, but they are demanding that contractors must back up their claims with actual payroll records." The AGC is asking that wage determinations be effective for at least six months instead of the 90 days now the rule.

**EXTRA VALUE...  
EXTRA PERFORMANCE**

**IN A 1/2-YD. MACHINE!**

# THE LORAIN 15



**EXTRA HOE VALUES!** — Buckets from 24" to 40" (3/4 yd.) — 2 Boom lengths — 14' and 16'.

Though nominally rated as a 1/2-yd. machine, the extra weight, strength and stability of the Lorain-15 enable it to match the productive capacity of many higher rated, more costly machines. As a shovel, hoe or dragline, it can do those *extra-size* jobs... with long life... freedom from operating delays... at greater profit to you. The Lorain-15 proves these points... if you will check the brief listing of features below and then check with your Thew-Lorain Distributor, you will see what we mean by "extra values." You make the comparison—then decide!

## **BIG-TIME FEATURES in the 1/2-yd. L-15**



**TURNTABLE  
FEATURES**



**CRAWLER  
FEATURES**



**BOOM  
FEATURES**

- 5 identical interchangeable shoe clutches • One-piece, all-welded, truss-reinforced, rigid turntable bed
- 19 anti-friction bearings on power shafts and clutch drums alone • Oil-enclosed cut gears • "E-Z" operating controls—effortless action; fast response; longer clutch life • "Hydra-Ease" power control of crawler steering, tread lock, house lock, and shifting of swing-travel jaw clutches.

- 16" cast-steel tread shoes—22" & 29" available
- Oil-enclosed crawler travel mechanism • 4-way position tread and travel lock, hydraulically powered and operated • Replaceable tread pin bushings available.

- Usable as shovel, crane, clamshell, dragline, hoe
- Crane boom of square-tubular-chord design; minimum weight, maximum capacity and reach • Power load lowering standard • Ability to "back-down-the-load"
- Precision boom lowering device for cranes • Independent crawler travel available—a big help in drag and hoe operations. Permits simultaneous hoist, swing and travel.



**EXTRA CRANE BOOM VALUES!** — For dragline, clamshell and lifting service feature new square-tubular-chord boom that permits maximum lifting capacities, greater digging ranges.

THE THEW SHOVEL CO., Lorain, Ohio

# THEW LORAIN®



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Some Like it Cold!**

*but whatever your preference  
in paving joint sealers...  
you're sure of top quality performance*  
**with PRESSTITE-KEYSTONE  
Paving Products**

Whether you're a cold-applied advocate or a proponent of the hot pour—PRESSTITE-KEYSTONE offers you the latest and the finest in both types of paving joint sealers.

These two reliable names are your assurance of controlled quality, dependable delivery and a personalized engineering service. Add to this your advantages of one complete buying source, one convenient inventory and billing account, plus the big savings of mixed-carload shipment.

**make PRESSTITE-KEYSTONE your one-stop source  
for all your paving product needs**

- Presstite Cold-Applied Joint Sealer #77
- Kapco® Hot Pour Asphalt Rubber Joint Sealing Compound
- Kapseal® Crack Filler
- Presstite Cold Applied Jet Airfield Joint Sealer #99
- Jetseal® Hot Pour Jet Airfield Joint Sealer

ALSO: All types of pre-formed Expansion Joints, Tongue & Groove Joints, Concrete Curing Compounds, etc.

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A Division of AMERICAN-MARIETTA COMPANY  
3782 CHOUTEAU AVENUE, ST. LOUIS 10, MISSOURI • 101 EAST ONTARIO STREET, CHICAGO 11, ILLINOIS

... for more details circle 250, page 16

## **Planning The Job**

From "Hendrickson News", an employee publication of Hendrickson Bros., Inc., General Contractors, Valley Stream, N.Y.

Much has been written about the performance and completion of various jobs. However, behind the actual daily and weekly work schedules lie much planning and preparation. As every mechanic, carpenter, operator or contractor well knows you cannot work merely on a day to day basis but a program, plan or schedule must be followed.

This does not mean that once a program has been drawn it must be adhered to the letter or the line. The plan charts the course but allows deviations for the wind, drifts and currents which are unpredictable yet surmountable by the good, experienced skipper and crew.

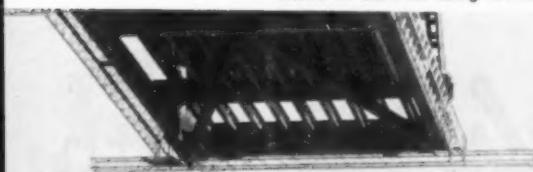
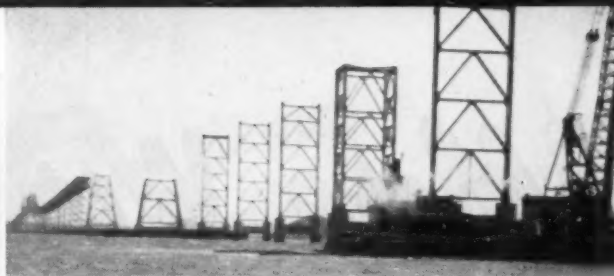
Naturally in the original estimating for a job the staff engineers have taken into consideration every facet of the plans and specifications. In calculating quantities each item is carefully checked on the premise that the job will be done on that basis. After the quantities have been summarized a conference might be held with the construction and purchasing departments to discuss the availability of material and equipment, various methods and procedures, comparative costs and other factors relative to the job.

• Discussion and conference are a vital element in the formulation of a bid and planning for the actual work. It has been figured that executive or management personnel spends a major portion of its time in communicating, that is, in conference, discussion, phone calls, instruction, etc. All these verbal activities are based on knowledge or know-how, and by talking through problems the obstructive wrinkles are ironed out. Of course the talk must be productive, as mere conversational chatter yields nothing. The end product of constructive thinking, whether in conference or on an individual basis, is the successful prosecution of the job in the field; it is toward that goal that all this planning effort must be directed. Unfortunately perhaps, the same thorough planning, effort and cost must be expended whether or not the competitive bid is won or lost. Until the respective bids

*(Continued on page 26)*



Le Roi compressors still have plenty of work ahead of them on rising 4.4-mile structure.



## Sea-Going Air Power Helps Assemble 4.4-mile Bridge

Air compressors are located at hard-to-get-at pilings

Some working more than two miles from land

Nearly a dozen Le Roi Airmaster compressors provide dependable power for air tools to speed steel assembly

Choppy waves and swirling currents tug at the pilings that support nearly a dozen Le Roi compressors. Gusty winds howl through the steel work high above the whitecaps. Yet progress is unhampered on the new \$62 million 4.4-mile bridge across San Francisco Bay.

**Dependability and easy starting of prime importance.** The 600-cfm Le Roi compressors placed out in the bay provide air power for air tools used on steel assembly work along the 21,343-foot span.

It's difficult to reach these units for servicing — yet reliable, uninterrupted performance is essential. That's why Le Roi compressors were selected. Exposed to driving, moisture-laden winds and piercing salt spray, these easy-starting, trouble-free air compressors keep plenty of air power moving through the hose. Further proof of the popularity of Le Roi compressors in the "Bay" area is found in the fact that Clementina Ltd. uses a fleet of 120 Le Roi's for rental purposes.

**A new method of handling long trusses was developed.** Because of the high winds and tricky tidal

currents, a set of 280-foot aluminum-alloy supporting spans was built which allowed on-site erection of the permanent steel spans.

**Second largest bridge.** Contractors on this new bridge to link Richmond and San Rafael, California are Judson Pacific, Murphy, Kiewit. The huge 4.4-mile span is surpassed only by the famed San Francisco Bay Bridge. Highest tower on this new structure rises 325 feet above the water.

Use Le Roi air power on all your jobs for reliable performance under all conditions. See your Le Roi distributor today.



**LE ROI** Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

# More Work-ability with

The simple, practical design of these "Euc" Scrapers with capacities of 7 and 12 yards struck is years ahead of the field. It brings you a new high in scraper performance and low cost yardage that has made Euclid the fastest growing scraper line in the industry.

Hydraulically controlled lever action provides fast, positive and independent operation of bowl, apron and ejector. Down time and delays caused by cable breakage are completely eliminated. All major components and the entire power train are readily accessible for easy servicing and maintenance.

Have your Euclid Dealer give you facts and figures on the S-7 and S-12 so you can compare them with your present equipment . . . you'll find that Euclids are your best investment.

S-7



7 yds. struck . . . 8 yds. at 3:1 slope . . .  
9 yds. heaped at 1:1 . . . 18.00 x 25 tires  
with 21.00 x 25 optional . . . 143 h.p.  
. . . NoSpin differential . . . non-stop  
180° turn in 28 ft.



Easy maneuverability of the S-7 makes it a versatile earth-mover for a wide range of work. Full hydraulic steering permits non-stop turns in only 28 feet . . . enables the unit to get in and out of close quarters. Here a load of topsoil is being spread at a New Jersey housing project.



With its low, wide bowl and adjustable 4-section cutting blade, the S-7 is a fast, easy loader . . . picks up heaped loads without pusher assistance in good materials. This "Euc", equipped with cab, is working on a big land leveling project in the state of Washington.

**EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio**

# S-7 and S-12

## "EUC" Scrapers



**S-12**

12 yds. struck...  
14 yds. at 3:1 slope  
... 16 yds. heaped  
at 1:1 ... 26.5 x 25  
tires ... 218 h.p. ...  
9' 6" width of cut ...  
NoSpin differential  
non-stop 180° turn  
in 31 ft.



Big 26.5 x 25 tires, NoSpin differential, Euclid planetary drive axle and 218 h.p. engine give the S-12 plenty of power and traction to pick up heaped loads in a hurry. On this Tennessee highway job, the 28 mph top speed with capacity payloads was a big factor in maintaining high production at low cost.

**Contractor preference  
for "Euc" Scrapers  
results from  
pay-off performance  
on the job.**



Rugged construction of the S-12 keeps down time to a minimum—it's designed for work on the toughest jobs with big push tractors. Heaped loads of heavy clay—15 yds. and more—were picked up in a short travel distance on this South Carolina railroad grading project.



# Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



... for more details circle 209, page 16



**No. 87 Torch**—up to 30 hours of steady, weather-resistant burning. Ideal for excavations, road shoulders, rubbled areas.



**"Little Wizard"**—up to 30 hours of wind-defying light that burns bright, stays bright to the very last drop!



Sound, highly visible safety lighting that's dependable in all weathers . . . How much does it cost?

Seldom more than 1/4th of one percent of your cost for the project!

Yet serious accidents due to inadequate safety lighting can cause an upward revision in insurance rates that makes good lighting seem cheaper than ever!

When you protect the public, you protect *your pocketbook*—or the one you're responsible for.

**Dietz does it . . . for pennies per day!**

Here is the most complete line of long-burning kerosene lanterns and torches on the market.

Here is *dependable* night-long protection for drivers . . . for pedestrians . . . and for you!

● Ask your safety lighting man to take a good look at the **DIETZ** line of safety lanterns and torches, at your distributor's or hardware dealer's. **R. E. DIETZ COMPANY, 102 Leavenworth Ave., Syracuse 1, New York.**

**OVER A CENTURY OF SAFETY LIGHTING**

. . . for more details circle 198, page 16

## Planning The Job

(Continued from page 22)

are read each contractor must feel that he has a potential job. After the results of the bids are known the various post mortems and second guesses are as valuable as the observations of the Monday morning quarterback.

When as and if the bid is won, however, planning and preparation can begin in earnest. The electrifying stimulus resulting from a favorable award seems to crystallize the thoughts of the various members of the organization whose job it is to formulate the program and make the necessary coordinating arrangements within and without the company.

Planning the various phases of a job to be done could be likened to a military campaign where there is the over-all strategy and the various tactical decisions which must be made within that framework. Naturally these latter vary with the situation and the terrain. The master program or strategy has been basically planned in the formulation of the bid but now requires implementation and the making of firm commitments or charges through the respective departments. In a well-knit organization these are handled with a minimum of direction or formal order. However, smaller phases of the job planning must be delegated to subordinates who hold responsibility and authority within their own sphere.

## Cooperation of Utilities

One of the first activities in the heavy construction industry is effecting coordination and cooperation with the various utilities which might be involved. For example if telephone poles have to be moved or water, gas, electric lines or conduits cross or parallel the job the necessary marking, shifting or protection must be arranged well in advance of the work progress schedules. Bus lines, traffic lights, detours, diversions and other phases of traffic control must be planned for in advance or chaos and disruptions of vital communications and services would prevail. These must be ready when needed and only adequate planning and preparation will insure it.

● Another vital factor that must be arranged for systematically in advance is the supply of requisite materials to the job. A certain few items of material in varying quantities apply to all jobs but each job has unique re-

(Continued on page 29)





**"SMOOTH AS STEAM" WITH S-5 HAMMER:** 12" tubing is being driven to approx. 47' for pier bearing piles for an approach to Cincinnati's Third Street Distributor. The "powerhouse" of this operation is the Jaeger "600"

rotary, at right of the driving rig. The single acting Model S-5 McKiernan-Terry hammer, with a bore of 14" and a 3 1/4' stroke, hits 60 blows per minute of 16,250 foot pounds when operated with Jaeger "Air-Plus" pressure.

## Sixty 16,250 lb. wallops with 600 cfm of Jaeger air

To put 16,250 pounds of pile driving wallop into a McKiernan-Terry S-5 hammer, 60 times a minute, you need a 40 hp boiler or a Jaeger "600" rotary compressor.

The Jaeger rotary does the job efficiently and a lot more conveniently. It puts out 600 cfm of 100 lb. air with its 6-71 GM Diesel engine operating at only 1650 rpm. (Other "600" rotaries need 1750 to 1800 rpm.) Moreover, control of engine and compressor are so closely regulated to air demands that pressure is held constant even under the extreme fluctuations of pile driving. Engine speed modulation is smooth and stepless over the entire operating range.

You enjoy the same operating advantages on other types of air work and also in smaller Jaeger rotary compressors. It will pay you to get full details or demonstration from your Jaeger distributor—or let us send you Catalog JCR-5.



**HOW TO OPEN TRENCH, FAST:** Three miles of conduit trench, in a Tacoma, Wash. street, was a fast-moving job with two #25 Thor breakers powered at top efficiency by a Jaeger "125" rotary. Compressor holds 8 hrs. fuel supply and a full set of tools; weighs hundreds of pounds less than old types; is easily rolled along on retractable pneumatic tired dolly wheel.

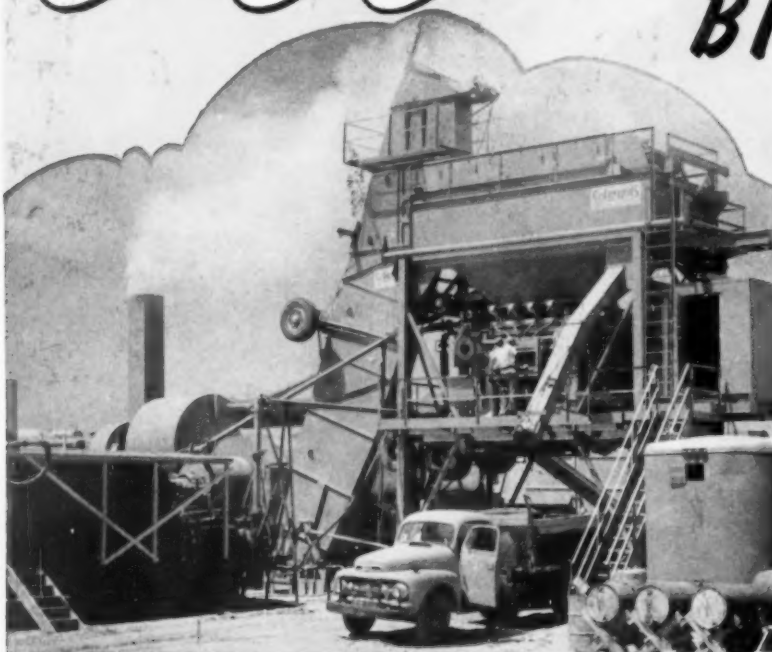


### THE JAEGER MACHINE COMPANY

223 Dublin Avenue, Columbus 16, Ohio

PUMPS • CONCRETE MIXERS • SPREADERS • FINISHERS • TRUCK MIXERS

... for more details circle 229, page 16

**Cedarapids**Built by  
IOWA**G 60**  
THE 3-TONS-AT-A-BATCH PLANT**SIZED  
FOR THE  
BIG JOB  
AHEAD!**

**ON THE KANSAS TURNPIKE**  
**5 out of 9 BITUMINOUS PLANTS are**  
**CEDARAPIDS G60's**

For the longest dual-lane asphalt-paved highway project ever undertaken in the U.S., these Kansas Turnpike contractors turned to Cedarapids G60 plants for the most profitable production.

**RENO CONSTRUCTION CO.**, with a Cedarapids G60 operating near Chelsea, Kansas, is producing approximately 165,000 tons of asphaltic concrete at a 200 ton per hour rate.

**IMPERIAL PAVING CO.**, operating near Waco is averaging well in excess of 200 tons per hour of specification mix.

**MCCARTHY IMPROVEMENT CO.** is turning out 200 tons of material per hour with their G60 plant near Matfield Green.

**BROCE CONSTRUCTION COMPANY** has a G60 plant set up near Emporia.

**PETER KIEWIT SONS' CO.** is operating a G60 plant near Wellington.

- Basic capacity rating of 180 tons per hour, mixing 6000 lb. batches, on a one-minute cycle.

- Designed to mix, and often does at a rate of 225 tons per hour with 7500 lb. batches, on a one-minute cycle — under favorable conditions.

- Turns out a batch a minute under normal conditions, and often capable of a 40-second mix cycle.

- Conforms to most specifications without variation.

**PRODUCING** all the asphaltic concrete needed for the big new highway program is a giant-sized job. It takes a turnpike-proved plant like the Cedarapids G60 to fill turnpike tonnage requirements fast . . . and with the accuracy to meet increasingly rigid specifications. Cedarapids G60 plants were originally designed for the big capacity and low production costs that let contractors bid low on the big money contracts. G60 design has paid off for contractors on turnpike jobs from New Jersey to Kansas. It will pay off on your future turnpike contract!

**IOWA MANUFACTURING COMPANY**  
**CEDAR RAPIDS, IOWA, U.S.A.**

## Planning The Job

(Continued from page 26)

quirements, the supply of which must be programmed to the work schedule with all its possible ramifications and variations from the basic plan. Take for example the needs on a large job for concrete pipe, concrete, steel and lumber. These supplies for delivery to jobsite must be ordered for delivery when they are needed. That is, they should be at jobsite just before the job will use them. This policy of course must be tempered with common sense and recognition given to the fact that the cost to the job will be regularly checked to detect variations from budgeted cost. Amplification of the material planning required would be a treatise of itself.

All the material, equipment and progress schedules would avail little if the construction division did not have the men with the "know-how" to bring the work itself to satisfactory completion. Know-how is the priceless ingredient, for without it the organizational mixture never will rise out of the pan. The construction chief plans the job by keeping in mind the availability of equipment and personnel with their special skills and limitations. These varying factors are not merely juggled but directed positively to the desired goal. Here too a man is permitted all the responsibility and initiative which his past performance and talent will justify. He answers only to the chief who so delegated the responsibility and accountability. And within his limited area he too will plan and at the same time make adjustments for changes that will arise just as surely as night follows the day.

Planning, preparation, application, administration, supervision, examination, adjustment, discussion and results are not merely words for they mean different things to different people in the light of their own experience. It is experience or empirical knowledge which permits successful planning of large jobs. Successful jobs don't just happen but they are made to happen by faithful performance of all items as planned.

● Following 19 years of service, the J. E. Greiner Company, Baltimore, has been succeeded by Michael Baker, Jr., Inc., of Rochester, Pennsylvania, as consulting engineers for the Pennsylvania Turnpike Commission. The Greiner contract was cancelled by G. Franklin McSorley, commission chairman.

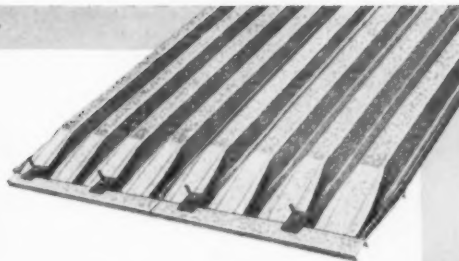
A NEW



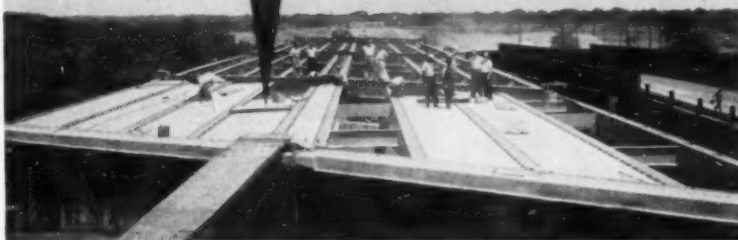
PRODUCT... *Leave-In-Place*

# STEEL FORMS

FOR CONCRETE BRIDGE FLOORS



Bridge on U.S. Route 13 over Pennsylvania R.R. Tracks near Morrisville, Bucks County, Penna.



Investigate this new USF Leave-In-Place steel form for concrete bridge floors. Made of galvanized steel, trapezoidally corrugated in laying widths approximating 24" for clamping direct to structural flanges, it particularly adapts itself to structures involving high or hazardous conditions. Permits all form work from top-side and eliminates shoring and stripping of old-fashioned wood forms. Once in, you leave-in-place. Low cost—to be sure!

- Erect fast—Leave-In-Place
- Eliminate shoring and removal expenses
- No warping, cracking, shrinking, or swelling
- Save manhours and material waste
- Speed-up schedules—save dollars and penalties

Write for data sheet now



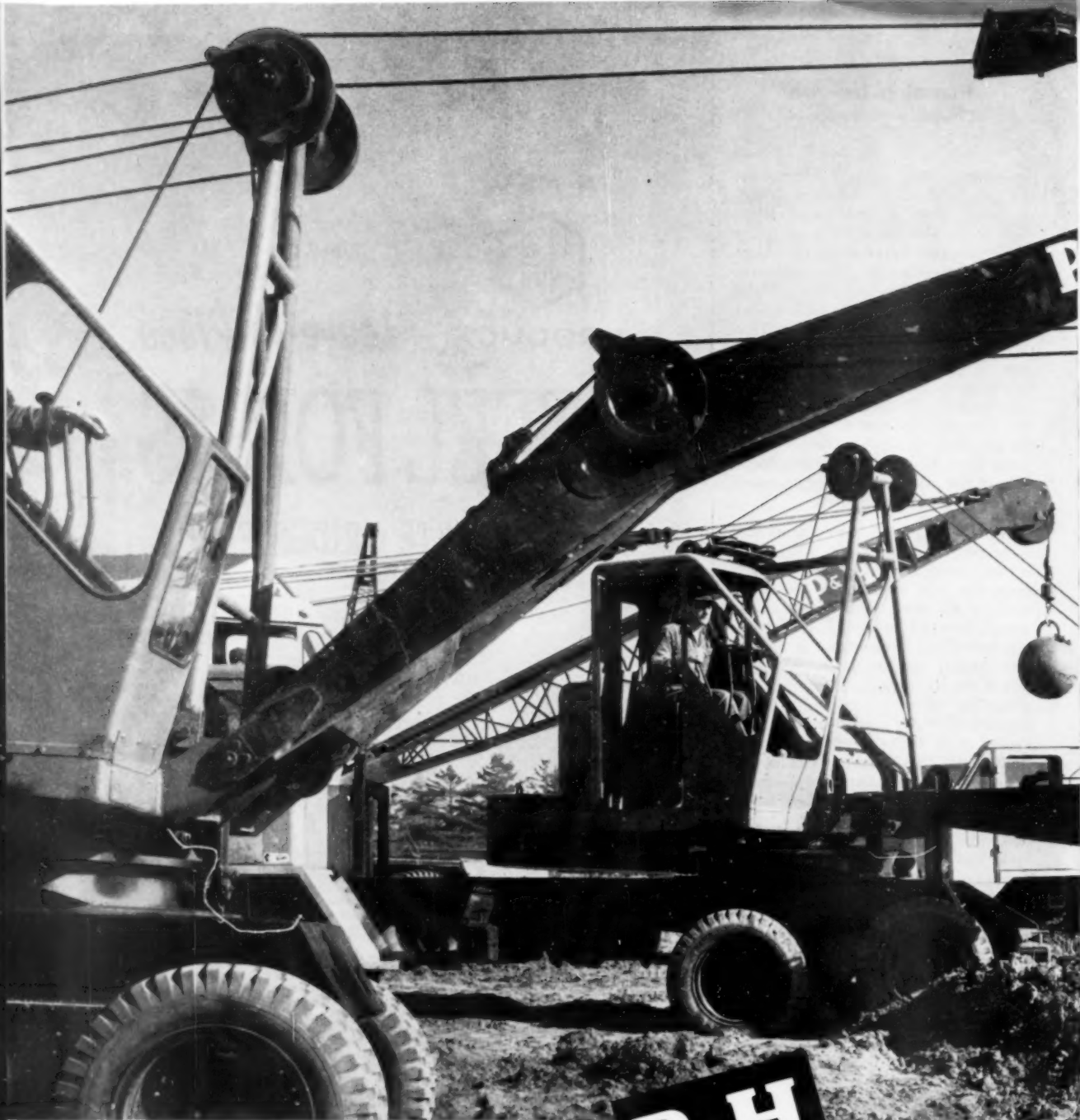
**UNITED STEEL FABRICATORS, INC.**

WOOSTER, OHIO

PRODUCTS

Hollow Metal Doors • Prefabricated Metal Buildings • Window Wells  
Highway Guard Rail • Bridge Flooring • Corrugated Metal Pipe  
Sectional Plate Pipe and Pipe Arches





# Proving that **P&H** has

Today P&H is recognized as the leader in the excavator industry.

## Why?

Because P&H, and P&H alone, has taken excavators out of the steam shovel era and applied automotive-type construction, automotive-type power trains and automotive-type controls to power cranes and shovels.

## The result?

Power crane and shovel performance that delivers the highest net operating profit.

No matter what your shovel or crane needs are, be sure to get the full, profitable benefits of P&H unit rolled construction, *fabricated by arc welding*. This feature alone eliminates troublesome assembly by multiple mechanical joints, bolts, rivets and tie rods!

Get the full P&H story—proof that P&H has the “guts” to do any job; proof that is borne out every day on the Harnischfeger Proving Grounds where every shovel and crane is thoroughly tested. Harnischfeger Corporation, Milwaukee 46, Wisconsin.

the **P&H** Line



TRUCK CRANES DIESEL ENGINES POWER SHOVELS PREFABRICATED HOMES HOISTS SOIL STABILIZERS WELDING EQUIPMENT OVERHEAD CRANES





## the GUTS to do the job!

The unretouched photograph above shows P&H equipment being tested at the Escanaba, Michigan, Harnischfeger Proving Grounds

*For Modern Engineering, Look to*

# HARNISCHFEGER

Power Crane & Shovel Division

... for more details circle 215, page 16



Soil-cement road in  
New Kent County,  
Va. Built in 1938.

Old Route K-32, in  
Leavenworth County,  
Kan. The soil-cement  
was placed in 1940.

## **"OLD TIMERS"**

### **prove durability and economy of Soil-Cement Roads**

The veteran soil-cement roads shown here provide ample proof as to the durability and dependability of soil-cement paving. They show, too, that soil-cement pavements are delivering all-year, all-weather service in all parts of the country under all types of climatic conditions.

These roads were constructed by scientifically controlled procedures first put into practice in 1935. The passing years, with their ever-mounting traffic load, have demonstrated the soundness and effectiveness of these methods.

For additional information about low-first-cost, low-maintenance-cost, long-lasting soil-cement roads and streets, write today for free illustrated booklet, "Soil Cement Pavement." Distribution is limited to the United States and Canada.

**PORTLAND CEMENT ASSOCIATION**  
Dept. 10-28, 33 West Grand Ave., Chicago 10, Illinois  
A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work



Soil-cement road in  
Davies County, Ky.  
It was built in 1938.



Soil-cement road in  
Chickasaw and  
Pontotoc Counties, Miss.  
Road paved in 1939.



California State Rte.  
33-A (U.S. 466) in  
Kern Co. Built with  
soil-cement in 1937.

★ ★ ★ ★ ★  
**20<sup>th</sup>**  
★ **ANNIVERSARY** ★  
★ **SOIL-CEMENT** ★  
★ **PAVING** ★  
★ ★ ★ ★ ★

# The **Euclid TC-12** gives you more work-ability than other Crawlers



The first really new tractor concept in years...  
with **ALL** the performance features you've wanted

Euclid's Model TC-12 Twin-Power Crawler establishes an entirely new standard of tractor performance. It's built to deliver unequalled drawbar horsepower, easy operation and a smooth, steady flow of power to meet any job requirement. It provides easy accessibility of all major components and all lubrication, check and adjustment points are located for maximum convenience. Unitized assemblies permit service or removal without a major tear-down of other parts.

Powered by two 194 h.p. engines at rated speed, 365 h.p. is delivered to the power

train. Each of the tracks is driven independently through separate Torqmatic Drives giving the TC-12 faster, easier steering and greater drawbar pull at higher speed. There's no clutch—shifting from one of the three speed ranges to another is done under full power—top speed in forward or reverse is 8.3 mph.

Have your Euclid dealer give you all the facts on the TC-12—compare with your present big tractor equipment and you'll know why so many owners have proved that **Euclids are your best investment.**

EUCLID DIVISION, GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

## **Euclid Equipment**

FOR MOVING EARTH, ROCK, COAL AND ORE



... for more details circle 279, page 16



## What a Seismic Survey did for the Massachusetts Turnpike

Faced with a tight time schedule and complicated geology, the 123-mile \$239-million Massachusetts Turnpike had to obtain the greatest amount of subsurface information in the quickest possible time. For this, the Turnpike Authority and general consulting engineers Howard, Needles, Tammen & Bergendoff, turned to Gahagan for a Seismic Survey, supplementing borings placed at key spots. Gahagan crews with portable equipment took 45,000 seismic readings between August 9, 1954 and May 4, 1955. These provided a continuous profile of bedrock along the centerline and 50 to 65 feet right and left of centerline, in all cuts and at sites of two major bridges. Final results were frequently rushed to section engineers in preliminary form within a day or two of field operations. Write on your letterhead for Bulletin 3 to Geophysical Survey Division, Gahagan Dredging Corp., 90 Broad St., New York 4, N.Y.

Established in 1898, Gahagan is  
a leader in hydraulic dredging

ANOTHER  
**GAHAGAN**  
CASE HISTORY

... for more details circle 206, page 16



Driving batter pile of trestle for the St. Lucie Canal Bridge in Florida. Schedules called for driving 42,000 lin. ft. of these 33-ft. light wall steel pipe piles in 90 days through a tight saturated formation of seashells, sand and marl underlaying the top 6 to 8 ft. of matted vegetable matter and sand. Skillful work by the contractor, Paul Smith Construction Company, and the powerful blows of a McKiernan-Terry 55 Single-Acting Pile Hammer powered by a McKiernan-Clayton Steam Generator completed this difficult task successfully within the time limit, with piles being driven at the rate of 30 ft. in less than 10 min. driving time. McKiernan-Terry Corporation, 30A Mercer St., Dover, New Jersey.

... for more details circle 241, page 16

## New Publications

PRACTICAL AND LABORATORY USE OF WIRE FABRIC IN BITUMINOUS RESURFACING AT WILLOW RUN AIRPORT. Technical Bulletin No. 215, American Road Builders' Association, World Center Building, Washington 6, D. C. This bulletin also contains a companion article on a similar subject. Available on request to above Association.

BITUMINOUS RESURFACING; Bulletin 123, Highway Research Board. The salvaging of existing pavements by resurfacing with asphaltic concrete is a common step in the restoration of inadequate or deteriorated pavements. This presents some new problems and activates some old problems in construction.

This bulletin presents several papers each dealing with one or more problems encountered in preserving or salvaging old pavements by bituminous resurfacing. The first paper concerns the resurfacing of an old and widened pavement. The second one describes the steps in preparing an existing concrete pavement for resurfacing. Condition surveys of bituminous resurfacing over concrete pavement are described in the third paper. The last paper describes some current practices and research on controlling reflection cracking.

Price \$0.75. Address Board Headquarters, 2101 Constitution Avenue, Washington, D.C.

ROUTE SURVEYING. Second edition of a manual by Carl F. Meyer, Professor of Civil Engineering, Worcester Polytechnic Institute. A three-part treatise covering basic principles, practical applications and readily usable tables. 318 pages. Price \$7.50. International Textbook Company, Scranton 9, Pennsylvania.

SMOLEY'S TABLES HANDBOOKS. A revised and enlarged edition of these six volumes has been published by C. K. Smoley and Sons, Inc., 30 School Lane, Scarsdale, N.Y. The volumes cover logarithms and squares, logarithmic trigonometric tables, parallel tables of slopes and rises, segmental functions; also three combined tables (the first three aforementioned) or all four tables in a single volume which incidentally represents 313 pages of completely new material. Prices of the above categories are respectively \$6.00, \$1.50, \$6.00, \$5.00, \$10.00 and \$12.00.

(Continued on page 36)



# B.F. Goodrich



## Sandy soil and 24-ton loads—here's a job for new BFG Special Earth Mover tires

THAT giant scraper is hauling 24 tons of sand fill for troop barracks at Fort Ord, California. Plowing through sandy soil under this payload, plus the weight of the equipment, would cause most tires to bog down and become useless. That's why this contractor uses these giant B. F. Goodrich 65" Special Earth Mover

tires with *all-nylon* cord construction.

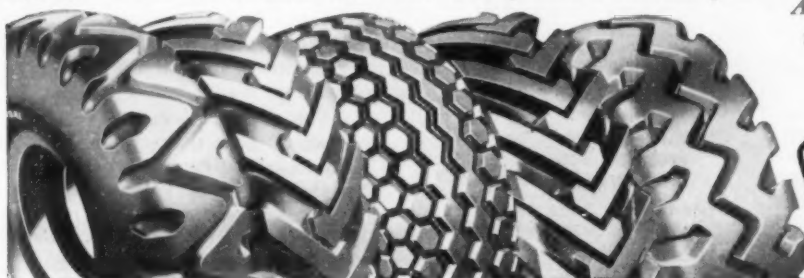
Special Earth Mover tires operate at low air pressures. They conform to the soil, rolling over it rather than digging into it. And to stand the strain of this flexing, B. F. Goodrich builds the Special Earth Mover tire with an *all-nylon* cord body.

Nylon withstands double the im-

pact of ordinary cord materials, resists heat blowouts and flex breaks. That's why B. F. Goodrich builds *all* of its off-the-road tires with an *all-nylon* body, why they can be recapped over and over!

Your B. F. Goodrich retailer has a longer-wearing, money-saving tire for every type of off-the-road work. See him today or write B. F. Goodrich Tire Co., A Division of The B. F. Goodrich Co., Akron 18, Ohio.

**There's a B. F. Goodrich tire for every construction job**



**Specify B. F. Goodrich tires when ordering new equipment**



Your B. F. Goodrich retailer is listed under Tires in the Yellow Pages of your phone book

... for more details circle 210, page 16

**ROADS AND STREETS, October, 1956**



## GET MAXIMUM USE OF YOUR 4-WHEEL DRIVE!

### SAVE ON EQUIPMENT... SAVE GAS, TIRES, REPAIRS

Warn Hubs on your 4-wheel drive make 2 vehicles out of 1, because you can use it as a light duty 2-wheel drive pickup, or 4-wheel drive work horse. Warn Hubs save gas, tires, repairs; stop front gear whine and shimmy in 2-wheel drive — and you have 4-wheel drive whenever needed. Automatically, too, with Warn Lock-o-matics! They select free-wheeling 2-wheel drive or tractive 4-wheel drive as you shift! When road conditions change, you just keep right on going in whatever drive is required. With Warn Hubs, whenever you use 2-wheel drive you're saving on operating costs — and because you have 4-wheel drive too, it's the only light vehicle you need! Lock-o-matic (and Locking) models for all makes 4 W. Ds. to 1½ tons. See Warn Hubs at your dealers, or write:



### NEW WARN LOCK-O-MATIC HUBS

Give your 4-wheel drive automatic free-wheeling 2-wheel drive — and automatic 4-wheel drive forward and reverse AS YOU SHIFT!

WARN MFG. CO., Riverton Box 6064-RS10, Seattle 88, Wash.

... for more details circle 269, page 16



### WHY Hand-Stitched Leather Covers Give EXTRA LONG WEAR

- CLOSER STITCHING  
HOLDS TIGHTER
- UNIFORM STRESS  
PREVENTS TEARING

**LUFKIN** CHROME CLAD **ANCHOR** STEEL TAPES

The everlasting choice in long steel tapes! Handsome, top-quality, leather case is hand-stitched over rust-resisting metal liner. Hand-stitching ensures a better, longer wearing outside cover. Exclusive Chrome Clad line is rust and corrosion resistant — will not chip, crack or peel. Bold black markings can't wear off. 25-50-75-100 foot lengths.

BUY **LUFKIN**

TAPES • RULES  
PRECISION TOOLS  
FROM YOUR SUPPLY STORE

THE LUFKIN RULE COMPANY  
SAGINAW, MICHIGAN



... for more details circle 273, page 16

## New Publications

**SOIL-TESTING METHODS: MOISTURE, DENSITY, CLASSIFICATION, SOIL-CEMENT.** This bulletin No. 122 contains four papers presented at the 34th Annual Meeting of the Highway Research Board, January, 1955.

The first paper, "Preparing Base-Course Materials for Disturbed-Soil Indicator Tests," by Harold S. Gillette, covers a cooperative research study to ascertain the differences in results of the disturbed soil indicator tests when one laboratory used the dry method and the other laboratory the wet method of preparing the same sample.

The second paper, "Rubber-Balloon Apparatus for Measuring Densities of Soils in Place," by R. L. Handy and D. T. Davidson, describes the development and use of a rubber-balloon apparatus for measuring densities in place on level, sloping or vertical faces.

The third paper, "Neutron and Gamma-Ray Methods for Measuring Moisture Content and Density to Control Field Compaction," by Robert Horonjeff and Donald F. Javete, describes the procedure and discusses the practicability of using such a method as compared to the usual field tests for moisture and density. The results of field tests upon a sandy loam are given.

The fourth paper, "Simplified Methods of Testing Soil-Cement Mixtures," by J. A. Leadabrand and L. T. Norling, discusses modifications and methods for shortening standard laboratory testing of both ASTM and AASHTO methods.

Use of the shortened test procedure has resulted in considerable savings of time, manpower and materials.

Price \$0.90 at Board Headquarters, 2101 Constitution Ave., Washington, D.C.

### New ARBA directory out

The 1956 edition of the Directory of "Highway Officials and Engineers" published by the American Road Builders' Association, is available at \$1.00 per copy, on request to the Association at 600 World Center Building, Washington 6, D.C.

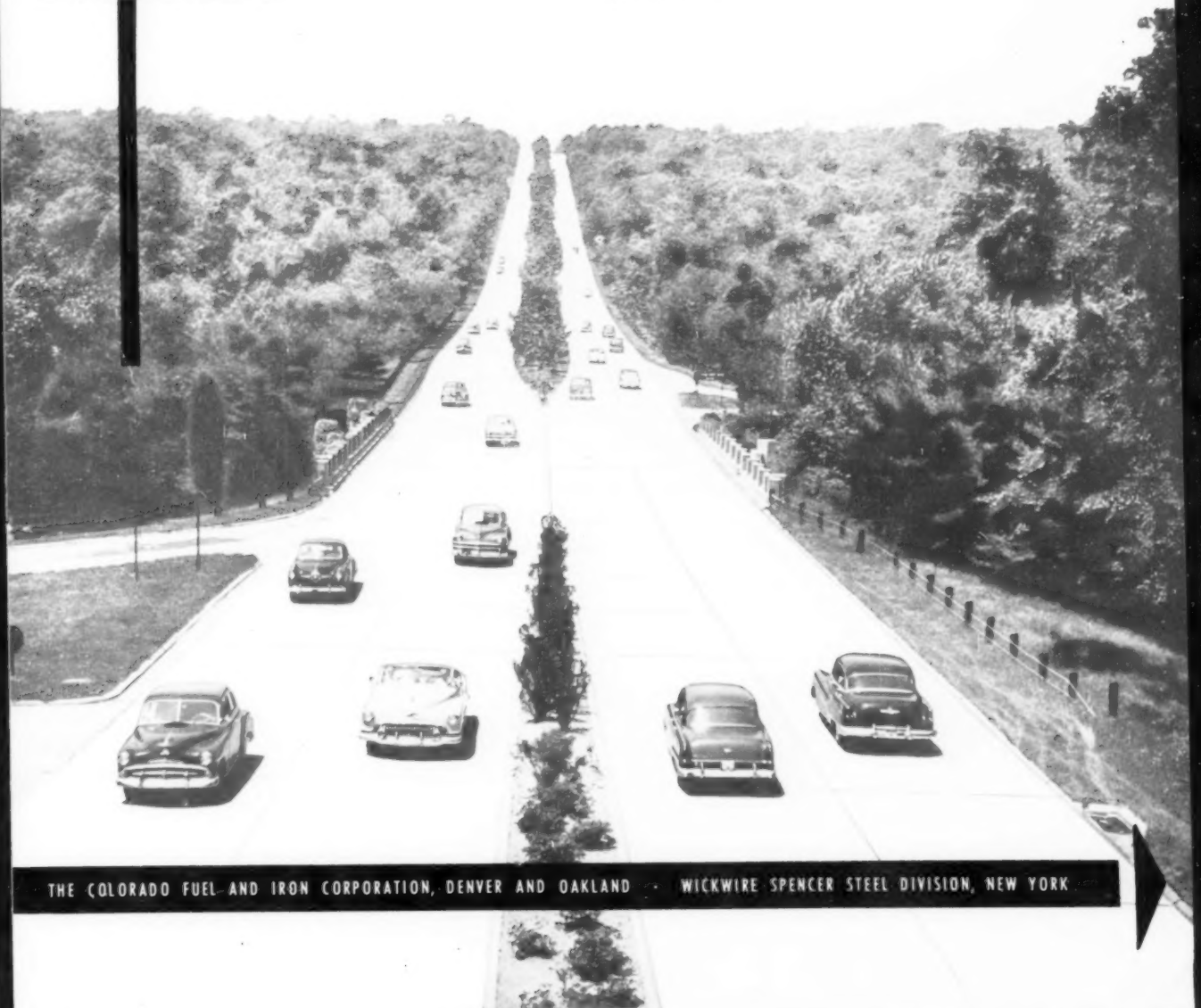
This popular pocket-sized reference contains more than 1500 names of administrative engineers and officials of the state highway departments, bureaus of public roads, toll road authorities and ARBA officers and directors. Also other valuable data.

here's the backbone of the highway...

# CLINTON WELDED WIRE FABRIC

Embedded in the concrete pavement, in the base course or in the asphaltic concrete surface, Clinton Welded Wire Fabric is the steel reinforcement that literally holds the highway together. The heavy, welded wires give positive mechanical anchorage of the concrete which means better load distribution and controls cracking.

Clinton Welded Wire Fabric is available in a wide variety of gauges and spacings for all reinforcing requirements. It meets all A.S.T.M. and A.A.S.H.O. specifications.



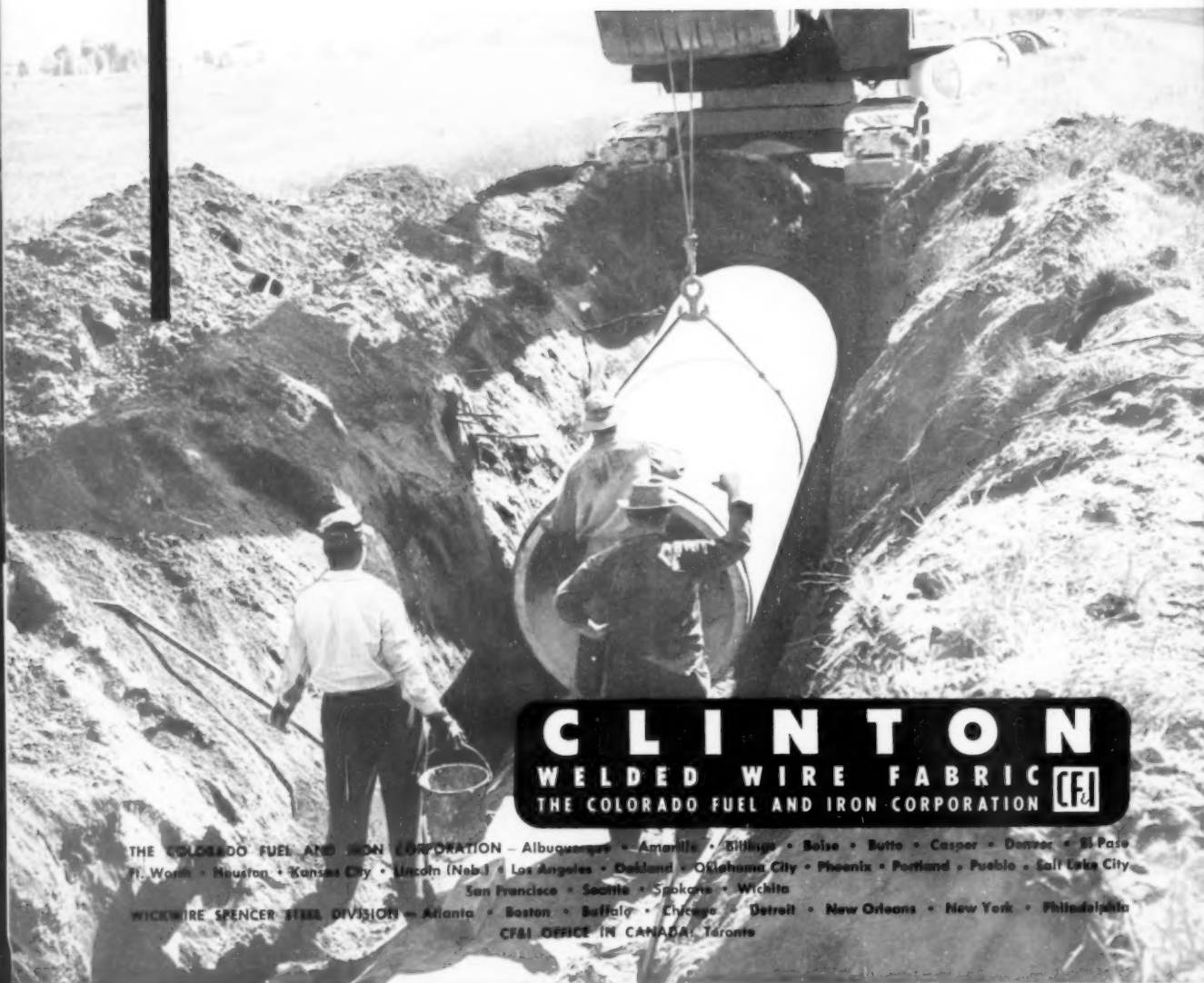
THE COLORADO FUEL AND IRON CORPORATION, DENVER AND OAKLAND • WICKWIRE SPENCER STEEL DIVISION, NEW YORK


# here's the backbone of concrete pipe..

## CLINTON WELDED WIRE FABRIC

Concrete pipe reinforced with welded wire fabric has the structural strength and freedom from corrosion necessary for maintenance-free pipe systems. Whether for new construction or for repair, when you specify concrete pipe reinforced with Clinton Welded Wire Fabric, you have assurance of a well-built job and a minimum of expense in the future.

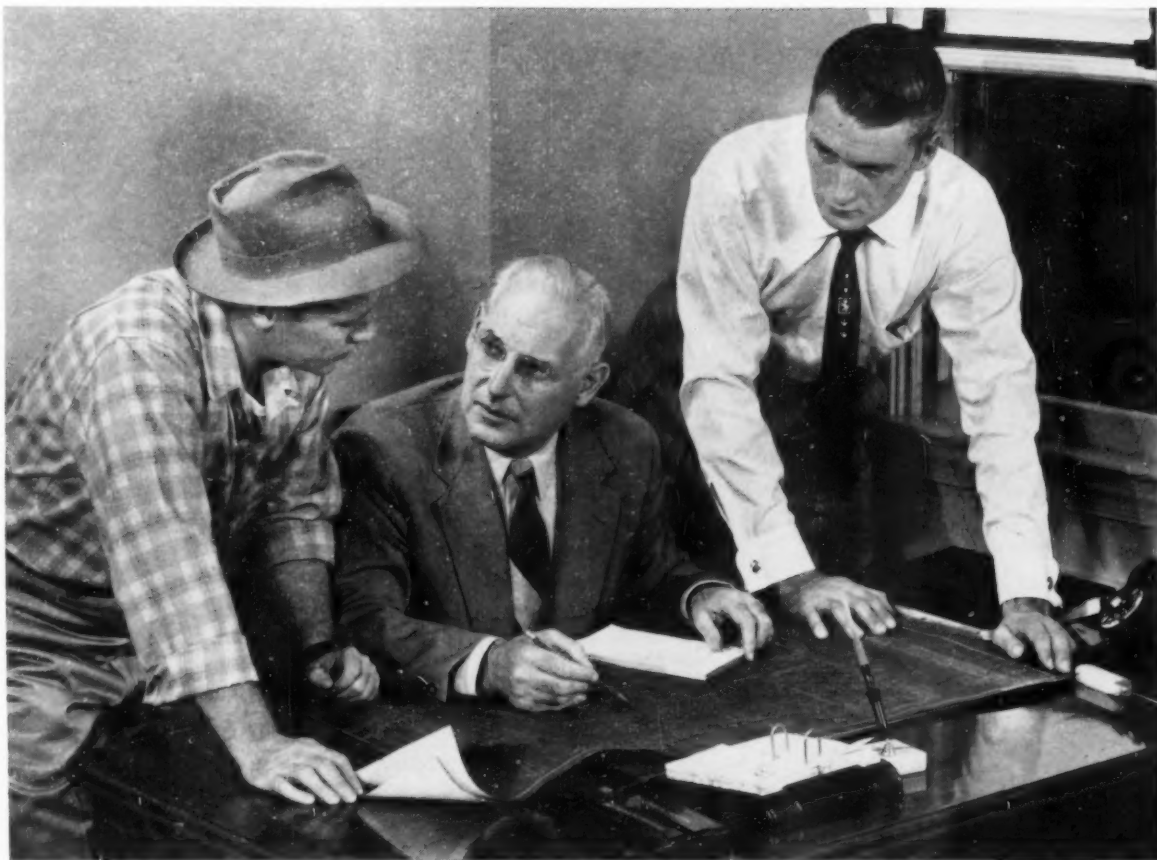
Clinton Welded Wire Fabric meets all A.S.T.M. specifications and is available in the complete range of gauges and mesh sizes.



**CLINTON**  
**WELDED WIRE FABRIC**   
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION - Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver • El Paso  
Fl. Worth • Houston • Kansas City • Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City  
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## Here's how Liberty Mutual can help you on your highway contract bid

If you are planning to bid on a highway contract, Liberty Mutual specialists will provide you with a detailed estimate of your insurance costs with no obligation on your part whatsoever.

Liberty Mutual underwriters and engineers will work with you . . . analyze the problems you will face in the proposed job . . . help to make sure your bid contains a realistic estimate of your insurance costs. These men know the road building business, for Liberty insures hundreds of highway contractors

across the country. Liberty Mutual has insured contractors on almost every major superhighway built in the United States in recent years.

If you would like Liberty Mutual to help you prepare an insurance estimate for your bid on a highway contract, write Mr. Parker M. Morrell, Liberty Mutual Insurance Company, Boston 16, Massachusetts.

**For twenty straight years . . . the nation's largest writer of Workmen's Compensation Insurance.**

# LIBERTY MUTUAL

*The Company that stands by you*

Liberty Mutual Insurance Company • Liberty Mutual Fire Insurance Company • Home Office: Boston.



**This Snow-Removal Team  
Doesn't Wait for Winter!**

## **FORD TRACTOR-LOADER** works every day of the year

With a Ford Tractor and new "Step-On" Loader, you have equipment that can handle many kinds of work, all year around. It's an excellent unit for fast, efficient removal of snow. It is also excellent for maintaining roads and streets, parks and roadsides.

The advanced design of the new Ford "Step-On" Loader allows fast, easy loading, lifting and dumping. Ford Tractors give

you greater ease of handling... extra power for jobs like loading, dozing and sweeping. They can be equipped to handle a wide range of other jobs, too.

For an investment that will keep paying dividends every day in the year, invest in a Ford Tractor and "Step-On" Loader. See your Ford Tractor and Equipment Dealer right away!



**CLEAR LARGE AREAS QUICKLY**—Ford Tractor with blade provides ample power to handle heaviest snowfalls. Attach broom to sweep streets and parking areas as the snow falls.



**LOAD A YARD A MINUTE**—Ford's new "Step-On" Loader provides capacity for a wide range of jobs. Compare it with any loader in its class for ease of handling and safety.

**TRACTOR AND IMPLEMENT  
DIVISION  
FORD MOTOR COMPANY  
BIRMINGHAM, MICHIGAN**





**"a Huber-Warco Maintainer  
is our most versatile  
piece of equipment"**



A 9' power sliding mold-board picks up loads smoothly.

All hydraulic controls are within easy reach of the operator.

The hydraulically controlled bulldozer attachment is ideal for filling in low spots before final grading.



Calling their Huber-Warco M-52 Maintainer their most versatile piece of equipment is a statement echoed by many contractors engaged in landscaping, light excavation, parking lots and driveway work.

As a grader, the Maintainer with torque converter, permits more load capacity without stalling or wheel slippage. Power and weight are matched for highest working efficiency.

Hydraulically controlled attachments such as a bulldozer, lift-loader, or back-hoe, add to the usefulness of the Maintainer for the contractor.

Other attachments available for use on the Huber-Warco Maintainer include a mower, broom, side dozer, snow plow, patch roller and berm leveler. These attachments are designed for highway maintenance work.

The M-52 Maintainer will outperform many machines that are larger, heavier, more costly, slower, more expensive to operate, and more limited in use. You owe it to yourself to investigate the unmatched versatility of the Huber-Warco Maintainer.



Huber-Warco Company  
Will See You At The  
**ROAD SHOW**

Chicago—Jan. 28—Feb. 2, 1957

For A Demonstration—See Your Nearest Huber-Warco Distributor



**HUBER-WARCO COMPANY**

MARION, OHIO, U. S. A.

*Road Machinery*

CABLE ADDRESS: HUBARCO



ROAD ROLLERS • MOTOR GRADERS • MAINTAINERS • GRINDERS

... for more details circle 223, page 16

ROADS AND STREETS, October, 1956

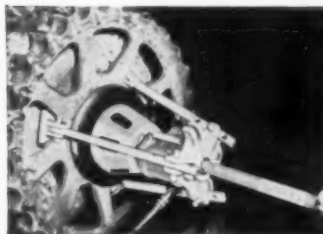
41

CRAWLER  
TRACTOR

## SPROCKETS - MASTER PINS REMOVED in MINUTES in the field



Removing Track Master Pin with OTC Hydraulic Ram and Adaptors.



Removing International Harvester Sprocket with OTC Hydraulic Ram and Adaptors.



## with **ONE** HYDRAULIC PULLER

Hydraulic Ram and Puller makes both jobs easier.

One man can remove a Crawler Track Master Pin or a Sprocket or both in mere minutes with the OTC Hydraulic Puller and Attachments. Available in 50 ton or 100 ton capacities these versatile sets are easily and quickly put to work in the shop or field. Hand or electric pumps are available . . .

The OTC POWER-TWIN HYDRAULIC UNITS are also easily adapted to pull, bend, straighten, press or spread—pull or install bearings, sheaves, gears or pulleys on all types of contractor equipment. Quickly pay for themselves in man hours saved. For the complete story on the OTC Hydraulic line write for Bulletin HY-55.

## OWATONNA TOOL COMPANY

381 CEDAR STREET • OWATONNA, MINNESOTA

. . . for more details circle 247, page 16

## CUT LAND CLEARANCE COSTS!

with ROWCO

# BRUSHKING

PORTABLE MACHINE DOES WORK  
OF 6 MEN CLEARING GRASS,  
WEEDS, SMALL TREES

Terrific for all land clearance . . . for road and highway maintenance. Cuts all brush right to ground level, and with grass trimming cutting attachment levels tall grass, weeds easily and quickly. Easy to operate, rugged, safe. Trims close to walls, fences, posts . . . reaches all hard-to-get-at places. Outperforms 6 men with axes, scythes or brush-hooks.



Rowco Mfg. Co., Inc.

82 Emerald St., Keene, New Hampshire  
Rush me details of the BRUSHKING.

Name \_\_\_\_\_

Street & No. \_\_\_\_\_

City & State \_\_\_\_\_

. . . for more details circle 253, page 16

## Personals

### Highway industry mourns passing of Harold Hess

With the death of Harold F. Hess, Executive Vice President of the Construction Industry Manufacturers Association, the highway industry lost the leader who has spearheaded the direction of the big Road Show to be held next winter in Chicago.

ARBA President John N. Robertson, speaking for the entire membership of the American Road Builders' Association and its affiliated CIMA group said that Mr. Hess' passing is "a sad loss not only to the highway equipment manufacturers whom he directly represented, but also to all segments of the highway industry."

"Hess served the highway industry for seven years with vigor and integrity. He will be greatly missed. Speaking for ARBA, our expressions of deepest sympathy are extended to his family."

SAMUEL C. HADDEN's death recently marked the passing of one of the historic figures of highway administration. Hadden was chairman of the Indiana highway commission on two different occasions, and was the 30th president of the American Association of State Highway Officials during the crucial war years of 1943 and 1944.

Mr. Hadden besides being an outstanding administrator was a man of great personal warmth and capacity for friendship. He was in great demand as a speaker, and was one of the eloquent spokesman for the cause of highways. Among his many honors was the George H. Bartlett Award given in 1952 for his contribution to highway progress.

During an early period Mr. Hadden was for a time on the editorial staff of Gillette Publishing Company.

DR. AUGUST J. DURELLI, internationally known authority on stress analysis, has been appointed professor in the civil engineering department at Illinois Institute of Technology, Chicago.

L. STERLING HEDGPETH is appointed district engineer for the U.S. Bureau of Public Roads in, Liberia Africa. Hedgpeth who was formerly chief of the specifications and materials section of the Bureau in Washington, will work in connection with an extensive highway development program financed under an Export-Import Bank loan agreement, involving \$20,000,000 of financing.



## Personals

JACK E. LEISCH, formerly Chief of Design Development Section, Bureau of Public Roads, in Washington, has joined the staff of De Leuw, Cather & Company, Consulting Engineers in Chicago.

BALDOCK, OF OREGON, GIVEN RETIREMENT TESTIMONIAL. "Sam Baldock — the Doctor" was the title of a summary presented at Salem, Oregon, recently, on the occasion of the retirement of R. H. Baldock, State Highway Engineer. Mr. Baldock has taken the post of chief engineer of the Iraq Highway Mission, representing the consulting engineering firm of Edwards, Kelsey & Beck under a contract with the International Cooperation Commission.

Mr. Baldock's long career as head of the Oregon State Highway work has brought him many honors including the following: Thirty-fourth President of the AASHO (1948); Member of the Executive Committee, AASHO; Chairman, Committee on Planning and Design Policy, AASHO; Chairman, Executive Committee, Highway Research Board, National Academy of Sciences; Chairman and Member, Executive Committee, Highway Research Board; Chairman and Member, Standing and Operating Committees too numerous to mention in the AASHO and HRB; Member, American Society of Civil Engineers; Member, New York Academy of Sciences; Member, Newcomen Society of England; Recipient, American Automobile Association Distinguished Service Award; Recipient, George S. Bartlett Award.

One of Mr. Baldock's earliest efforts was in the perfecting of specifications and equipment to achieve better bituminous construction at reasonable cost. There is hardly an aspect of highway engineering and administration that has not felt his influence.



R. H. Baldock



Davey Rotary Drill on James E. Hoffman job near Karthaus, Pa.

*cut drilling costs  
on every  
construction job!*

**DAVEY**  
**Rotary Drills**




On every big construction job, you can speed drilling . . . cut the costs of blast holes, structure testing, core drilling — with Daveys!

Davey Rotary Drills are suitable for mounting on any truck . . . move fast between jobs . . . are easy to set in drilling position. They are available in 6 different models—air blast, mud pump, or combination types. Rated capacities to 2,000 ft. Features include choice of power take-off or separate power unit operation, automatic hydraulic feed, hydraulic pull down, heavy-duty rotary table, rugged tubular box-type mast.


AA-1709

*Write for full details!*




**DAVEY**  
pioneers of  
"air-cooled air"


DAVEY COMPRESSOR CO. • KENT, OHIO




Portable Compressors




Industrial Compressors



Air Tools



Field Service Units



Rotary Drills

# New CAT\* No. 9 Ripper

## FOR THE

# Mighty D9!

First choice for push-loading, the D9 is now more versatile than ever. The new No. 9 Ripper lets the D9 rip tough or frozen material between loading cycles. Faster, easier scraper-loading cuts time and costs.



### TRACTOR-MOUNTED

The tractor-mounted No. 9 Ripper utilizes the weight of the D9 to force the teeth into hard material. No need for ballast or extra weights. The hydraulically operated ripper affords maximum maneuverability because it is tractor-mounted.

### "LIVE DRIVE" HYDRAULIC PUMP

New No. 50 Hydraulic Control has a constant power pump that supplies the capacity to raise or lower ripper teeth *independently* of flywheel clutch or torque converter.

### TWO RIPPING POSITIONS

Shanks may be pinned in either of two ripper positions which provide either maximum ground clearance when raised or maximum penetration (up to 29") when lowered.

### TRIPLE TEETH

Use one, two or three. Any or all of them can be swung up and pinned out of the way. Teeth pivot 10° to either side. This permits tractor steering and smoother ripping through rocks. Shanks are heat-treated alloy steel, with hardened alloy cast steel boots. Points are hardened cast steel, *pin-attached* for easy replacement.

### MANY OTHER IMPORTANT FEATURES!

Now the new No. 9 Ripper makes the "King of the Crawlers" an even more profitable and versatile machine. Mail the coupon for full details, or call your nearby Caterpillar Dealer. And remember, you can count on him for reliable service, and for parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

## CATERPILLAR\*

\*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**MODERN HEAVY-DUTY  
TRACTOR RIPPERS**

**MAIL TODAY!**

Caterpillar Tractor Co., Dept. D-95, Peoria, Illinois  
I would like more information on the new No. 9 Ripper

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

Zone \_\_\_\_\_

State \_\_\_\_\_

... for more details circle 190, page 16

# Mixed-in-Place Concrete Paving Method Shows Fast Production Possibilities

*Self-propelled roadmixer mixes concrete successfully in unique freeway experiment in California, with contractor, engineers and manufacturer cooperating to test the possibilities.*

**W**ORKING without a paver or truck mixers, an experimental lane of portland cement concrete has been mixed in place successfully on San Bernardino Freeway in southern California.

Under the interested sponsorship of contractor Peter Kiewit Sons' Co., the California division of highways, Pettibone Wood Manufacturing Co. and the Portland Cement Association, the test was conducted on a 485-foot-long accelerating lane 12 ft. wide and 8 in. thick. The lane was located near one of the bridge structures in the \$6,000,000 contract. Chief purpose of the test was twofold: (1) Would the new self-propelled Model 54 Pettibone Wood Roadmixer pick up concrete aggregates and cement from a windrow and turn out a finished mix of Class A concrete in one pass? And (2) is there a possibility of boosting paving production and lowering costs by the new method?

Interested construction officials of California's division of highways in Sacramento and Los Angeles arranged for the necessary permission so that



● Concrete turning out behind the Pettibone Wood Roadmixer. Average slump was 2 in. after water content was equalized.



● Picking up the cement-and-aggregate windrow.

the Kiewit firm could make the experiment. Run late in May, the experiment has already proved that the Pettibone Wood Roadmixer can mix concrete from a windrow about as well and perhaps faster than conventional pavers. Previously, the same mixer had turned out 150,000 sq. yd.

of cement-treated base as a routine item in the 4-mile-long freeway construction contract.

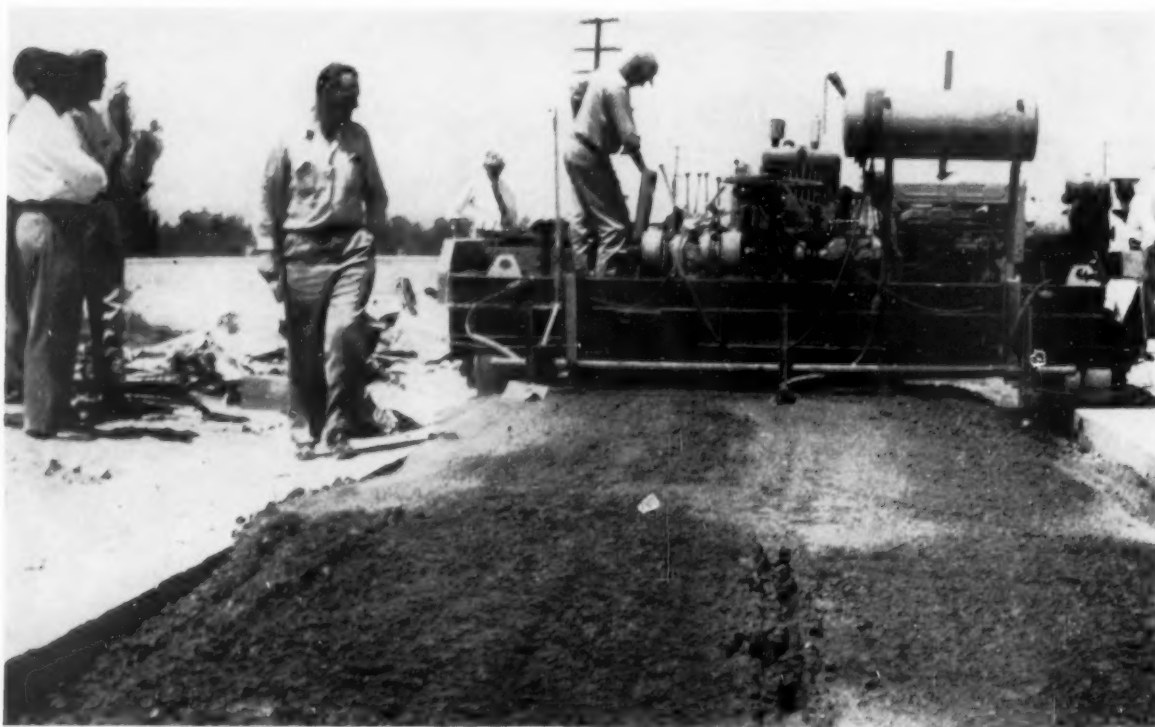
The idea of mixing highway concrete pavement in place on the sub-base has for several years interested men who work with paving. Contractors who turn out 1,100 cu. yd.

of concrete in a day's run with two conventional pavers have toyed with the tantalizing thought for a long time that the Model 54's capacity in low gear is about 175 cu. yd. an hour . . . more in the higher gears. It is not difficult to set up 2,000 to 2,500 cu. yd. daily runs — in theory, at least — based on the machine's rate of speed.

Several years ago, R. D. Leibsle of Pettibone Wood gave a paper on concrete technology at Iowa State College at Ames. While he was there, several engineers speculated openly whether the mixer would mix concrete and turn it out so that it could be placed by a slip-form paver without side forms. Other engineers wondered if a good grade of concrete couldn't be produced in place, then compacted and finished, and possibly be topped with asphalt hot mix to create a new type, easily-constructed highway. It was a combination of ideas like these which finally bore fruit in the California test.

#### How Work Was Done

The experiment was set up for one of the accelerating lanes, rather than for a regular freeway lane, because it will carry generally a lighter traffic load than the main freeway lanes. Also, it was desirable to preserve the uniformity of past paving methods on the regular freeway lanes in case the

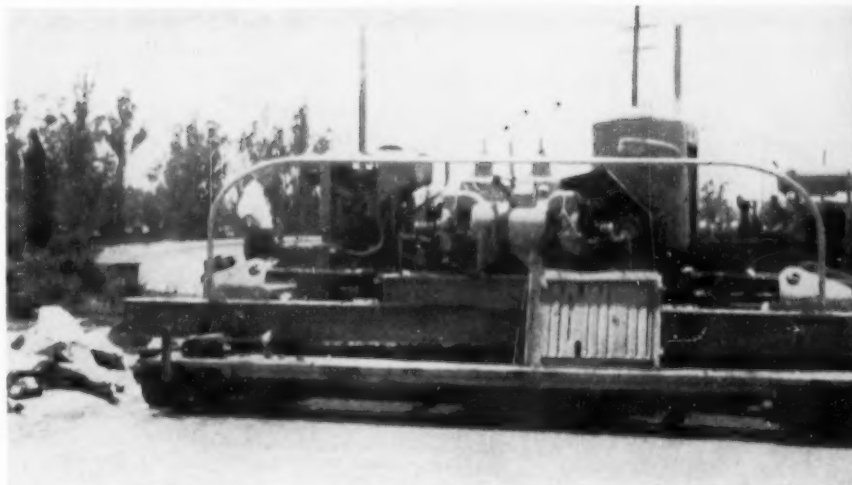


● Vibration behind spreader. Concrete deficiency had to be made up with mixers but experiment was considered worthwhile.

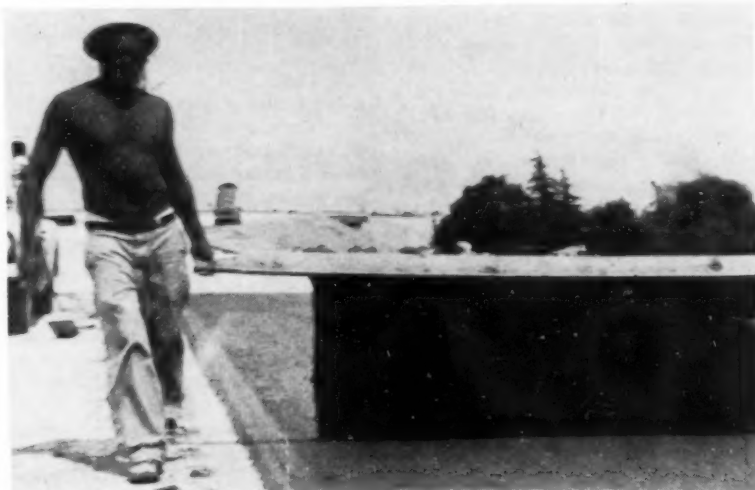


experiment failed to prove up. One of the tricky job conditions, as a result, was that the test was conducted with a previously-poured concrete lane on one side, and the sloping, curved top of a Type E curb on the opposite side. The difficulty of keeping the paving spread centered, because wheels tended to slip on the curved curb, was quite a problem during the test.

Engineers of the California division of highways had specified a regular 5-sack concrete mix, made with  $1\frac{1}{2}$  in. minus aggregate, sand, and cement. The aggregate and sand was batched out by Kiewit's job batching plant, and hauled without trouble to the test location, where it was dumped through a Pettibone Wood windrowing machine. Because practically everyone was afraid that the windrow



● Finishing of the surface was routinely accomplished.



● Burlap drag finish — same as for regular work.

would be too heavy, resulting in a waste of concrete, the first 200 ft. of windrow placed was slightly on the deficient side. Theoretical size of the windrow was about 10 cu. ft. per lin. ft. This amount was used on the last half of the lane and the yield checked nicely.

The dry cement content was added by trucking in this material in 94-lb. bags, using a short unloading conveyor to transfer the sacks to the windrow site, and a labor crew to split the bags. At the time the cement was added, sand and aggregates in the windrow were fairly dry.

A single pass then was made through the test section by the road-mixer. Containing 26 paddles in its pugmill, this machine can handle a windrow containing 11.5 cu. ft. per lin. ft. It will travel between 6 and 9 fpm in low gear and 18 fpm in the

highest mixing gear. At the start, all paddles in the pugmill were in normal position. Later, two paddles were reversed to improve the appearance of the concrete mix. An item of interest was the fact that the big self-propelled machine was towing its own water tank trailer. On routine cement treating, it also tows its own leveling blade.

There was no difficulty whatever in turning out the concrete mix, insofar as the machine was concerned. Since it was a new operation, however, the experiment had its slowdowns. For example, the mixer wasn't started on a perfectly level plane, and when it soon leveled up, there was some unmixed material. The operator on the water tank truck turned on his centrifugal pump when he shouldn't have (the Model 54 has pumping

● Assistant resident engineer Wally Knutsen looks at the completed job. No difference from conventionally mixed concrete is visible.





● The same Roadmixer is shown here on base treatment. Machine handles own water truck and tows leveling drag.

equipment to handle what water it needs quite accurately), so a short stretch was mixed too wet. Lack of flanged wheels on finishing equipment next to the Type E curb caused that equipment to slip quite a few times, and that also caused the mixer to slow down or stop until auxiliary machinery was operational again. Even so, the experimental lane was mixed out in about two hours.

Finishing equipment working behind the Roadmixer included a Jae-

ger spreader with three vibrators mounted on the rear of its frame, a Blow-Knox tamper, and a Johnson flat finisher. These are typical for the type of routine concrete paving California does regularly. The slight deficiency of concrete in the early part of the strip made it necessary to haul some additional loads of material in with a truck mixer. Fresh concrete from this machine was dumped in just ahead of the spreader, as necessary, to make up the difference.

### Test Prototype for Prestressed, Precast Toll Road Bridges



● Plenty of traffic moves over this "bridge to nowhere." The structure located near Elgin, Ill., was built and tested during the 1956 summer as a prototype for 200 similar ones needed on the 193-mile tollway system of Illinois. Built of prestressed, precast concrete, bridge is shown here supporting two 97,000-lb. cranes and two earthmoving vehicles weighing 76,000 lb. each. (United Press photo.)

Conclusions, if any can be drawn from the experiment, can be summed up as follows:

1. The ability of the Roadmixer to mix concrete seems to have been proved without question. Seven-day flexural breaks of test beams showed 500 psi strengths. That was 50 psi higher than California requires for admittance of traffic; somewhat higher than the general average of breaks on beams made from conventional pavers.

2. As with any other method of construction, this method if adopted will not eliminate careful planning on the job. The little things which went wrong, mentioned previously prove that details are still important even if this machine will sometime be used routinely to mix concrete pavements in place. But good planning, thorough supervision and schooling of ground crews should soon eliminate the rough spots, just as they do on other types of work.

3. There was no apparent trouble in maintaining a consistent product.

4. There was no apparent trouble in maintaining uniform slump when all the mixing water was handled by the Roadmixer pump.

5. No special precautions against segregation of aggregate and sand particles seem to be necessary.

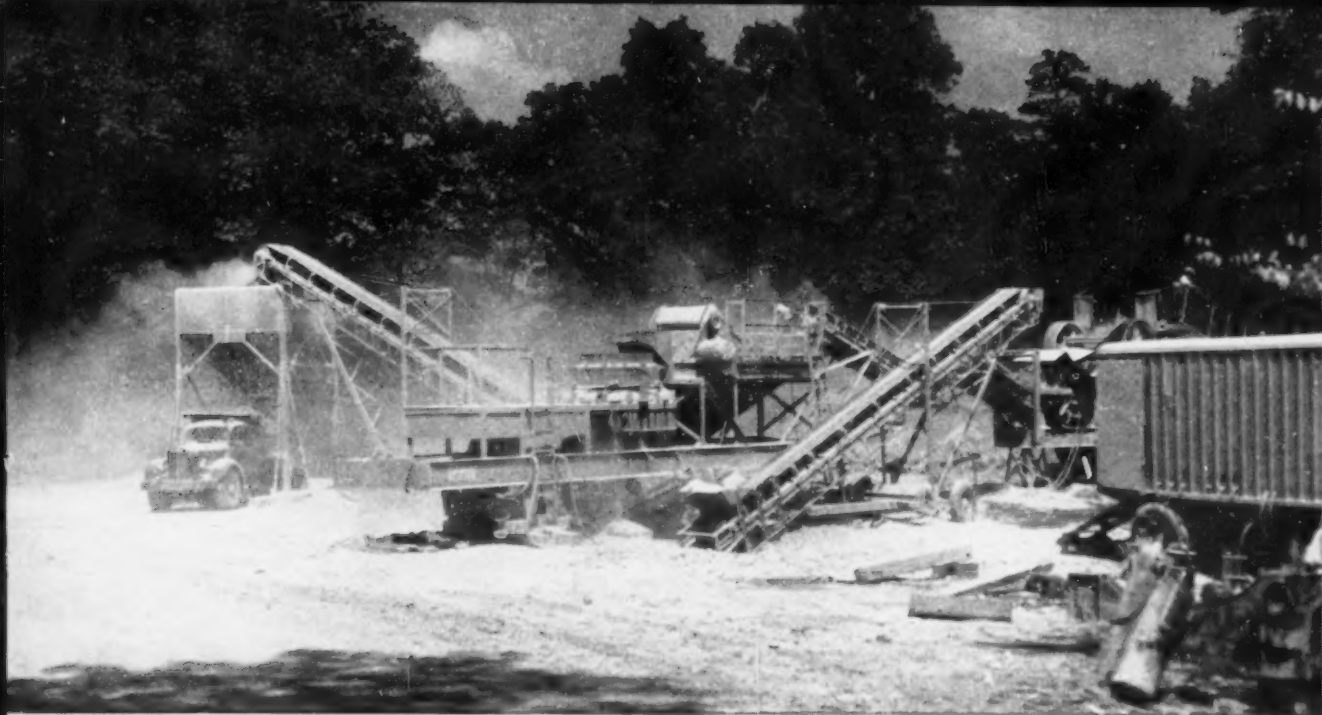
6. Mixed-in-place paving, possibly on a much reduced water-cement ratio and perhaps with vibratory compaction, seems to have feasibility and to be worth further experimentation.

7. Mixing production rates in the 250-300 cubic yard per hour range appear attainable with this method.

### One-day traffic seminars held in Michigan

County road commissioners, county and city engineers, and other officials responsible for highway administration in their areas were given a new opportunity this past summer to get help in solving their traffic engineering problems.

Initiating a program of providing assistance on urban and rural road problems, the Highway Traffic Safety Center of Michigan State University, with the cooperation of the state highway department, the Michigan state police and the County Road Association of Michigan, conducted a series of eight one-day conferences at strategic locations in the state. Though the main emphasis of these area conferences was on street and highway traffic problems from the engineering standpoint, other major phases of safety were also covered.



## HOW MOBILE CAT\* POWER PAYS OFF FOR LAMBERT BROS., INC.



A D397 Mobile Electric Set provides crusher power on a job for Lambert Bros., Inc., near Greenback, Tennessee. The 315 KW D397, Caterpillar's biggest trailer-mounted electric set, is well within highway weight and size restrictions.

When Lambert Bros., Inc., Knoxville, Tennessee, received the contract to furnish 26,000 tons of base material for road construction near Greenback, it set up the operation pictured here. The company provided its own power with this Cat D397 Mobile Electric Set. The 315 KW unit provided the power to run the Cedarapids crusher, working 8 hours a day, 5 days a week. Output averaged about 900 tons a day. Said Lambert's Ben L. Greene: "I like the D397 because it gives us a maximum amount of operation with a minimum amount of maintenance."

For dependable electric power, *when* it's needed and *where* it's needed, you can't beat Caterpillar Electric Sets. They're available in a complete range of sizes, up to 315 KW, for use in emergency or full-time operation. Each is a complete unit, mounted on skids, semi-trailer or trailer. Easy to hook up and easy to op-

erate, they deliver steady voltage. There's one that fits your needs and—as Mr. Greene points out—provides maximum performance with minimum maintenance.

Wherever you move these sets, you always have the plus of prompt service, right on the spot, from your nearby Caterpillar Dealer. For complete information about these versatile power plants, see him soon.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

# CATERPILLAR\*

\*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**MODERN, HEAVY-DUTY  
PORTABLE ELECTRIC POWER**

# Oversize Crushers Solve Troublesome

Some of the fine points in performance  
of 42 x 48 jaw and secondaries to  
match, as set up by Badger Materials, Inc.,  
for 500,000-ton production job.

*Second in a Series on Aggregate  
Production for the Kansas Turnpike*

**R**OCK crushing on the Kansas Turnpike is as tough as rock crushing ever gets."

That statement, made by J. A. Gallagher, president of Badger Materials, Inc., of Madison, Wisconsin, just about sums up the experience of many a contractor on the Sunflower State's famous toll road. Gallagher has some comparisons which are interesting.

The same plant which Badger Materials is using near El Dorado, Kansas, was set up in sandstone on the West Virginia Turnpike, where it produced 600 tph without difficulty. Near Windham, Ohio, on the Ohio Turnpike, the same equipment in a previous season did nearly that well in a drier, more easily fractured rock formation. On the Kansas Turnpike, the same equipment is working hard to get 3,100 ton in ten hours. And the Badger Materials set-up is regarded as one of the most productive on the Kansas Turnpike.

● *Limestone Problems Serious.* The principal problem which makes rock crushing so difficult on this turnpike is the geology of southeastern Kansas. The turnpike originates in Kansas City, runs west through the population centers of Lawrence and Topeka, angles southwest through Emporia, El Dorado and Wichita, and then extends almost due south to the Oklahoma line. The entire highway is in the state's southeastern quadrant. This is mostly farmland; not rock country. In the El Dorado vicinity the only good quality ledge rock supply consists of a layer of Towandah limestone, which sometimes lies deep under the fertile soil, and in a few places outcrops toward the surface.

Under average conditions, the rock lies in place with a moisture content anywhere from 7 to 10%. It is covered by clay and often shot through with shale. Its structure is fine grained; its

behavior soft and rubbery. There are some rock formations, particularly of igneous origin, which tend to explode in a jaw crusher. Not so with Towandah limestone. A piece of this rock, pulled into a jaw crusher, must be worked on by the jaws until each piece is broken and rebroken again until it finally is reduced to size. And even then, there are some fragments which are long and rectangular which will clear the jaw opening but will hang up to tear conveyor belts.

Behavior of the material in a roll crusher is equally bad. A roll crusher, operating at 250 rpm, hits the incoming material a devastating series of blows, imparting a continuous, terrific squeezing action on the rock passing through. But if any of these fragments consist of pieces of shale or hard clay, the momentary resistance of such fragments is such that they will not break down or explode as rapidly as hard rock. What happens then is that the roll crusher faces must spread apart, while mounting springs

● There is an old saw saying, "A picture is better than a thousand words" . . . true here because it shows typical chunks of limestone rock which have to be broken down to crushed aggregate. The 4248 handled anything this Lorain 2½-yd. could load.





# Limestone Problem for Kansas Turnpike

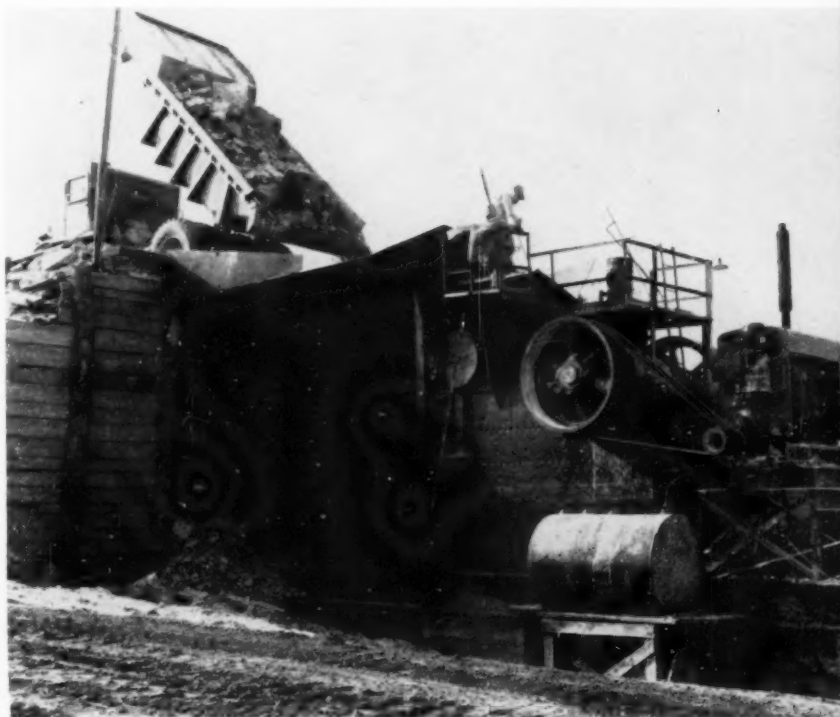


● Taken from the top of the aggregate stockpile, this view shows how the Badger Materials plant was laid out for crushing and hauling efficiency.

compress and the engine governor opens. Repeated time after time, this is hard on rock crusher equipment.

"I don't know of any crushing equipment on the Turnpike which is being babied," explained Gallagher and his general superintendent, Levi Vieth. "Ours is certainly getting a workout, and the amazing thing to us is that our production is as high as it is under the circumstances."

● **Big Crushing Job.** The crushing assignment of Badger Materials, Inc., calls for approximately 500,000 ton, centered around the towns of El Dorado and Augusta. There (adapted for the westerly 186 miles of turnpike) are three principal classifications of material. Turnpike design for flexible pavement includes a 10-in. course of sub-base rock, 8-in. crushed stone base course, and a 4-in. paving mat of hot-plant-mixed asphaltic concrete. The specification tolerances are such that Badger Materials can manufacture both the sub-base and crushed rock base-course material as one material. Asphalt concrete aggregates are being made simultaneously by scalping off good sound rock particles from one part of the plant and sending this material through a small aux-



● The big Pioneer 4248 overhead eccentric jaw crusher is shown in action here as a Euclid dumps a load of raw material into its feeder hopper.



- Cedarapids Commander portable plant at left reduced one fraction of output to gradation required for asphaltic concrete. Belts in center of picture are for secondary and surge hopper part of the plant.

iliary portable crusher set up to one side of the main plant.

#### Specification Tolerances For Material

- Following are specification tolerances for the various types of material:

#### Size Screen

1 inch	.....
¾ inch	.....
½ inch	.....
No. 4	.....
No. 10	.....
No. 40	.....
No. 80	.....
No. 200	.....

#### Per Cent Passing (Surface Course)

100
86-100
55-80
40-66
22-40
12-26
4-9

#### Per Cent Passing (Binder Course)

100
76-100
64-89
38-64
25-50
12-28
7-18
4-8



- Tracy B. Hardin, office manager, Levi Vieth, general superintendent, and J. A. Gallagher, president, respectively, Badger Materials Co.; E. A. Dolan, partner, Payne & Dolan, Chicago, which is in joint venture with Badger Materials Co. on project.

#### Sub-Base Crushed Rock

Size Screen	Per Cent Passing
2 inch	100
1½ inch	100-75
1 inch	100-60
¾ inch	95-45
No. 4	80-25
No. 10	65-17
No. 40	40-8
No. 200	10-0

#### Crushed Stone Base Course

Size Screen	Per Cent Passing
2 inch	100
1½ inch	100-70
1 inch	100-60
¾ inch	95-39
No. 4	75-25
No. 10	55-17
No. 40	30-8
No. 200	10-0

The design criteria require not less than 15% sand being added to the asphalt concrete aggregate, of which 85% must pass a No. 10 screen. Blended together in a paving mix, this combination is expected to develop from 3 to 5% of voids in the total mix for surface course material; 4 to 7% of voids in the total mix in binder course material. On sub-base and base-course rock, engineers expect to get a minimum of 95% Modified AASHTO densi-

#### Asphaltic Concrete Aggregates

ty on 6-in. lifts with three passes of a 50-ton pneumatic compactor, and a CBR reading of not less than 60. A weighted average CBR value of 75 is expected with these mixes.

General engineering consultants in charge of this design is the firm of Howard, Needles, Tammen & Bergendoff. Sub-base production, design and inspection of the Badger Materials assignment is under Brink-Dunwoody-Rector, architects and engineers of El Dorado, Kansas. The job, which is typical of turnpike design, will comprise two 24-ft. traffic lanes with a 10-ft. outboard shoulder and a 4-ft. shoulder next to the dividing median.

- *In-Line Production.* The Badger Materials plant is an excellent exam-

ple of in-line, efficient rock production. Every effort has been made throughout to keep the native rock clean, with provision to pull acceptable material for storage the instant it meets requirements, and to maintain uniform, excellent gradation.

The Towandah limestone outcrop is covered at this location by about 2 ft. of clay overburden. It has been necessary to strip this clay aside with bulldozers, including quite a bit of surface rock, to get rid of all clay which has penetrated into surface fissures. Wagon drills with regular rock bits are being used here to put down blast holes. The explosive ratio is about 1.0 lb. per cu. yd. of material. A 2½-yd. shovel and end-dump truck units are being used to bring the broken limestone in to the first components in the plant setup.

The first plant component is a Pioneer Oro feeder whose manganese steel plates move the oversize chunks of limestone in as necessary. The heavy feeder frame is mounted on concrete pedestals and heavy steel channel irons, designed to cushion the shock as heavy truckloads of broken limestone dump in. A light cushion of rock is maintained over the feeder plates, so that when a load is dumped the rock falls on rock and not on metal.

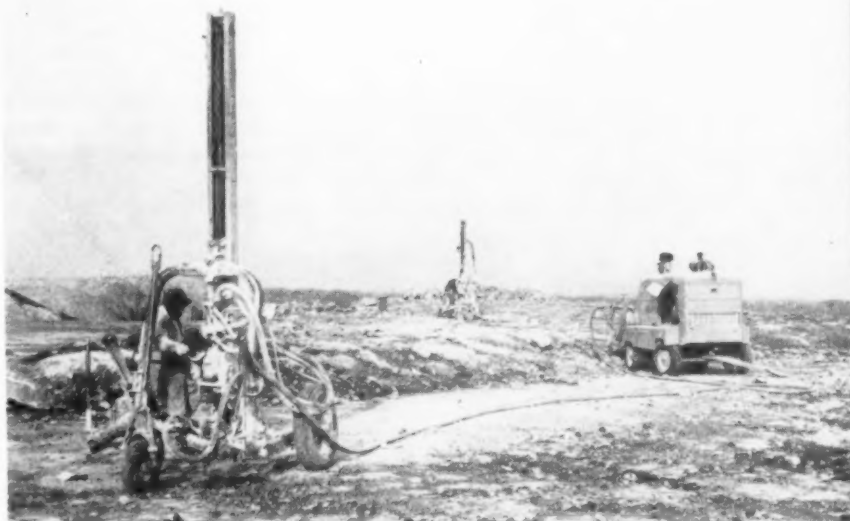
One of the principal items of interest in the plant set-up is the use of a Pioneer 42 x 48 overhead eccentric jaw crusher, driven by a 300 hp diesel engine, to take the feeder output and reduce it to minus 6 in. Most of the other contractors are using 30 x 42 jaw crushers, but Badger Materials went all the way and bought the biggest size.

On this crusher the eccentric shaft is located at the top of the pitman. This big crusher here has demonstrated a peculiarly effective stroke, which actually tends to force rock fragments through as crushing action takes place over the full length of the jaws. As the pitman shaft rotates, a combination of the overhead eccentric at the top of the pitman, and the toggle plate at the lower end, impart a crushing motion which is circular at the top but changes gradually to an oval motion at the bottom. There is a continuous downward crowding action at all points between, and no neutral zones where crowding or crushing does not occur. This crusher can be operated at 250 rpm without slowing the unit down, to wait for rock to work through the jaws. What slowing down there has been on this installation has resulted from a slippery characteristic of the soggy limestone.

Particularly at the upper end of



● The Pioneer surge bin loads out subbase material, supplied at high speed by the roll crusher and screening unit shown at left.



● Gardner-Denver wagon drills supplied by an Ingersoll-Rand 600 cfm compressor on the Badger ledge.

the stroke, wet pieces of limestone tend to slide. It is this tricky characteristic of the rock which has done more than anything else to reduce the input of material to the jaw crusher. On the West Virginia Turnpike the same jaw crusher handled 500 tph quite easily.

The jaw crusher works only on the plus 6-in. portion of incoming material. A grizzly feeder separates finer material and bypasses it under the jaw crusher to a 36-in. feeder belt,

which stacks jaw crusher throughs, along with this preliminary grizzled material, to the next portion of the plant.

Badger materials is adding the sand fractions of its mix by means of a short Pioneer conveyor and feeder, dumping the material on the 36-in. belt after it leaves the jaw crusher.

Raw feed from this loading conveyor dumps to the top screen deck of a Pioneer 4 x 12-ft. double-deck vibrating screen. The top deck of this





● End of the line for crushed limestone is shown here as an International truck dumps through a power-driven spreader box on grade. Addition of sand at the plant makes further work unnecessary other than rolling.

machine is equipped with 4-in.-square mesh, which scalps off good solid rock fragments suitable for the manufacture of asphalt concrete aggregates. This fraction is dumped by chute to a Cedarapids Commander portable plant, whose rolls, jaw crusher and screening system reduce the material progressively to meet the asphaltic concrete aggregate specifications. There is temporary storage in a surge hopper for this material, after which trucks haul it over to the hot plant site nearby.

Material passing the 4 x 12 upper screen deck goes through to a 2-in.

screen deck, where a sizable portion is retained. This fraction is then routed into a 54 x 24 Pioneer twin-roll unit, which is driven by two Murphy diesel engines totaling 340 hp. Throughs from this roll crusher unit return in closed circuit to the top screen deck, so that final sizing is done as material passes through the 2-in. mesh of the bottom deck of the vibrating screen unit. A 36-in. stacker conveyor then removes finished material to a surge bin, where trucks and trailers can either haul it to stockpile or transport it direct to the job.



● Tangled mass of machinery shown following an explosion of blasting materials on the S. J. Groves & Sons Co. project on the Massachusetts Turnpike, set off during an electrical storm. (United Press Photo).

● **High-Speed Schedule.** Badger Materials, Inc. is plagued by a definite time limit for completion because of a desire on the part of the Kansas Turnpike Commission to get the road completed and placed in service as quickly as possible. If all goes well the turnpike gates should be opened for traffic by October of 1956. That time limit, which carries penalty clauses, made it necessary for the company to work throughout the winter of 1955-56. A great deal of material was stockpiled during the worst weather when it was impossible to place and process the crushed rock on the turnpike roadbed. And despite the extremely tough crushing condition, the company's equipment has stayed on the line in a production status. It was even necessary in several cases, when the aggregate production plant was temporarily down, to route the entire output of all materials through the 54 x 24 Pioneer roll crusher unit.

Placement of the material out on the highway is largely a routine operation, thanks to the blending of sand in the mix at the plant.

The trucks hauling to the highway simply dump their loads of material through two spreader boxes, which string the crushed rock out in uncompacted lifts calculated to deliver the right thickness after compaction. The 50-ton rollers compact the 6-in. lifts in about three passes.

### Picture tells story of blasting hazard

The accompanying photograph of the wrecked 5-yd. power shovel and 25-ton dump truck is a reminder that blasting materials and electrical storms don't always mix with safety. One worker was reported to have been hospitalized as a result of this premature explosion which took place on the Massachusetts grading project of S. J. Groves & Sons Co.

According to a news report, a large quantity of explosives was detonated by a bolt of lightning during a violent storm. The report did not say whether the explosives were stowed away in blast holes at the time, awaiting a shooting, or were in cartons on a truck, or in a nearby building.

The project on which this mishap occurred is the heavy rock grading job described by a **ROADS AND STREETS** staff report ("When You Can Drive It With a Jeep, You Have It Made," **ROADS AND STREETS**, December, 1955). The latest thinking on safe handling and use of explosives on construction was summarized in a more recent issue, ("Dos and Don'ts for Blasting Safety," April issue).



## Evening classes by highway department

The Colorado department of highways has set up two early-evening surveying and mathematics classes for its designers at Denver, under two staff members. Two dozen employees are thus devoting their own time to improving their skills and readiness for more responsibilities in the stepped-up road construction program.

The volunteer students are about evenly divided between a class in surveying for roadway design engineers and aides, and a course in the engineering application of trigonometry for bridge design engineers and technicians.

## Another section of Congress Expressway open in Chicago

Chicago and the surrounding county is seeing progress this year in expressway mileage opened to traffic. Latest segments to be opened include Congress Street Expressway leading into downtown from the Westside, now open for 7 miles following the completion of the segment near downtown. On August 10, immediately after opening, traffic on this expressway exceeded 100,000 vehicles daily.

## Michigan drops its plans for toll road

Plans for the 115-mile toll road from near Saginaw southward to the Ohio border near Toledo have been shelved, according to the Michigan state highway department. The department plans to speed construction of a free road roughly paralleling the proposed turnpike route.

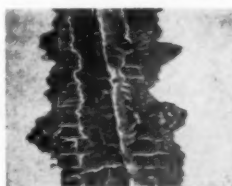
In a newspaper statement George N. Higgins, chairman of the Michigan Turnpike Authority, attributed this move as the reason for the abandonment of the toll project. It is in line with the latest trend of developments considered inevitable in most states as the result of the new Federal highway program of free express facilities on interstate routes.

The move culminates a long wrangle in Michigan, in which Charles M. Ziegler, state highway commissioner and also an executive member of the turnpike authority, has taken the view that motorists are entitled to a free superhighway. The department plans a project costing \$160,000,000 which should be open to traffic in 1959 or 1960, having a total length of 160 miles in north and south direction and tying in eventually with the Ohio Turnpike near Toledo.



## NEVER A REJECTED BATCH OF ALLIED JOINT SEALING COMPOUND!

In many years of production, not one rejection . . . that's proof of top performance. Allied seals make a positive protective seal wherever concrete slabs are joined, because they adhere firmly to the walls of the joint. Allied seals actually ride with the concrete as it expands and contracts due to weather variations. Allied seals will not flow from the joint or be picked up by vehicle tires, as ordinary materials will, at summer temperatures, nor will they lose bond or crack at low temperatures. The cohesion and adhesion qualities of Allied seals give you positive assurance of a dependable seal for all concrete joints.



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ALLIED SEAL

Uniform quality is strictly maintained in Allied seals so that each new batch is just like the last. This saves you the time otherwise lost adjusting equipment from one batch to the next . . . and time is profit.

Allied offers both hot and cold applied seals . . . so whichever your job requires, use Allied seals for the protection that is warranted by the tremendous investment in concrete paving. Allied Seal (hot poured) meets Federal Specifications SS-S-164. Allied Cold-Seal (cold applied) meets Federal Specifications SS-S-159.

## ALLIED BLAST RESISTANT JET SEAL

The perfect sealer for jet runways. This two component cold applied sealer is unaffected by the terrific heat and blast forces of jets or by jet fuels and solvents. It is economical and easy to apply . . . write for additional information.

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. . . for more details circle 271, page 16

# Engineered for

## World's most heavily traveled turnpike

The 118-mile New Jersey Turnpike, constructed with modern asphalt pavement, carried 25,888,319 cars and trucks in 1955. No other turnpike is so heavily traveled, yet this asphalt-paved superhighway is one of the safest heavy-duty roads in the world. Its 1955 safety record of 2.76 fatalities per 100 million vehicle-miles is far better than the 6.5 average for national highways.



# ASPH

# smooth, rugged service!

**I**N FOUR SHORT YEARS total traffic volume on the asphalt-paved New Jersey Turnpike has exceeded the total carried during the 15-year life of the Pennsylvania Turnpike, the grand-daddy of present-day toll roads.

Yet in spite of carrying more traffic than any other turnpike in the world, maintenance costs are low and the asphalt pavement is in excellent condition.

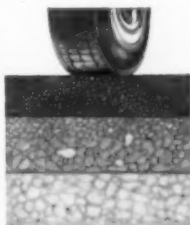
To highway engineers the New Jersey Turnpike's record of tremendous traffic and outstanding safety is a remarkable demonstration of the dependability of modern asphalt pavements for rugged, heavy-duty service.

Modern asphalt pavement saved \$50,000 a mile on the New Jersey Turnpike. For one thing, material costs were less because, as is usually the case with asphalt construction, economical use was made of local soils and aggregates. This is one of the many benefits of asphalt's versatility. Also, asphalt construction is faster. Thus the road begins to earn revenue sooner.

Modern, heavy-duty asphalt construction is demonstrating that it offers economy, durability and ease and speed of construction. That's why more engineers are recommending asphalt pavements—engineered for smooth, rugged service.

## Engineered for rugged wear

TYPICAL SECTION showing modern 4½" asphaltic concrete pavement on New Jersey Turnpike. Pavement structure designed from the ground up for axle loads of 36,000 lbs. Bids on asphalt design were \$5,000,000 less than bids for 10" rigid pavement to carry the same loading.



- 4½" Asphaltic Concrete
- 7½" Asphalt Penetration Macadam
- 6½" Compacted Stone or Gravel Subbase

## THE ASPHALT INSTITUTE

Asphalt Institute Building, College Park, Maryland

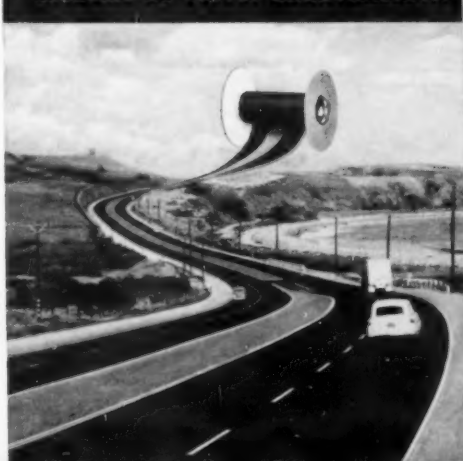


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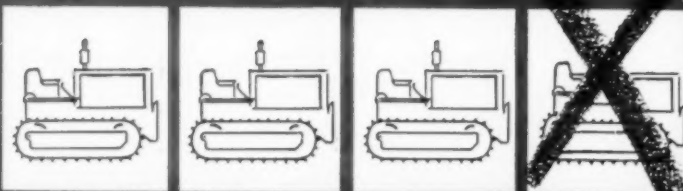
FOR MODERN HEAVY-DUTY HIGHWAYS

... for more details circle 182, page 16

## RIBBONS OF VELVET SMOOTHNESS...



# With men who know converters best...it's Twin Disc 3 to 1!



For years, the construction industry has been the "proving ground" for heavy equipment. And the toughest jobs, under the severest conditions, have constantly been assigned to the crawler tractors. That's why men who built and used crawlers were among the first to recognize the advantages of torque converter drive . . . and are the men who know converters best.

Today, the four manufacturers of the most powerful crawler tractors available all have torque converter equipped models. Of these, all three of the "Big 3" volume producers—Allis-Chalmers, Caterpillar and International Harvester—have special torque converter transmissions, in which they standardize on Twin Disc Torque Converter Components.

**TWIN DISC**  
CLUTCHES AND HYDRAULIC DIVISION  
**TWIN DISC**  
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois  
Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Tulsa

## 6 reasons for a torque converter in crawler tractors

For higher work output . . . and longer equipment life, more and more contractors are ordering their crawler tractors equipped with torque converter drive.

A torque converter offers six profitable, proved advantages applicable to your crawler tractors. 1. Multiplies torque *exactly* as needed (three-stage units up to 6:1). 2. Engines work up in the maximum efficiency range all the time, delivering constant high horsepower output . . . doing more work than units equipped with mechanical drive. 3. Power is matched to load demands automatically, with gear shifting minimized or eliminated — where mechanical transmissions must *stay* in the starting gear ratio, even after starting load resistance is reduced . . . operator efficiency is boosted. 4. Heavy load pick-up is smooth, even, without clutch slippage . . . better flotation is obtained. 5. Overloads, shock loads and vibrations are cushioned *out*, through *fluid* connection . . . providing longer tractor life with less maintenance. 6. Infinite variety of ratios is available to work with, permitting smooth, accurate control of loads and delicate "inching" under power.

For these reasons, today, the four manufacturers of the most powerful crawler tractors available have torque converter drive models. Of these, *all three of the "Big 3" volume producers* — Allis-Chalmers, Caterpillar and International — have designed special torque converter transmissions, in which they have standardized on Twin Disc Torque Converter Components. In each instance, Twin Disc Engineers worked closely with the manufacturer to aid in developing this complete torque converter power package to individually suit each of these crawler tractor's particular characteristics.

. . . for more details circle 265, page 16





**35% ahead of schedule  
on the Indiana Turnpike...**

## **THANKS TO SINCLAIR OILS AND GREASES!**

For an outstanding job on the Indiana Turnpike, J. C. O'Connor & Sons, Inc., contractors, share the credit with Sinclair.

Delwin Libby, Grade Superintendent, says: "We have moved just under 3,000,000 yards of sand in seven months. This project has been done using a minimum of types and grades of oils and greases. The result has been a reduction in lubrication in-

ventory, savings in labor, lessening the danger of misapplication, and *no failures due to lubrication*. Sinclair's co-operation has been of great value in helping us make this record."

You too can rely on Sinclair for dependable products and service. Just call your nearest Sinclair representative or write to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation!*

# **SINCLAIR**

# **LUBRICANTS**

**for every construction need**



Photo and Report by Interstate Industrial Reporting Service

## Georgia red clay — often studded with quartz and granite — "routine" for Cleveland owner

**CONCRETE CONSTRUCTION CO.** of Atlanta, Georgia, recently completed a trench excavating job for the installation of a gas main in the North Druid Hills near Atlanta. "This area," says a report from C. V. Lanier, field superintendent for Concrete Construction, "contains quartz and—since the spine of Stone Mountain underlies the district—chunks of granite. But, using one of our Cleveland 95's, we consider it just a routine job." Concrete Construction currently

operates nine Clevelands, three 92's, four 95's and two 110's. Mr. Lanier's report continues:

**"Trencher operations constitute the basis of our business—and to us that means Clevelands. Mechanically, we have never had a Cleveland halt in the field."**

Performance like this proves again that Clevelands dig *more trench . . . in more places . . . at less cost.* Talk it over with your Cleveland distributor.



**THE CLEVELAND TRENCHER COMPANY**

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... for more details circle 195, page 16

## Research

# How One State is Tackling its Local Material Problems

Study of loess and glacial tills, local aggregate utilization, retaining wall and wingwall design, value of local burned shale for subbases, problems in prestressed concrete, are among investigations being conducted by the State of Iowa, the Iowa State Highway Commission under a cooperative effort with the Bureau of Public Roads and Iowa State College.

**By John H. Bolton**

Iowa Engineering Experiment Station,  
Iowa State College, Ames

THE Iowa State Highway Commission since 1950, has, through its Highway Research Board, and from the state of Iowa and U.S. Bureau of Public Road funds, allocated \$624,260 to twelve research projects in the Iowa State College Engineering Experiment Station. The largest project is one to which \$229,665 has been given to investigate the stabilization of loess, sand, and glacial till materials. This work is being done under the direction of Dr. Donald T. Davidson. The work will be continued over several years' time. The purpose of the project is to investigate the engineering and geological properties of loess, sands, and glacial tills, and to learn how to stabilize them for use as highway bases, subbases, and subgrades.

Typical samples of the loess materials in southwestern, central eastern, and northeastern Iowa have been collected and have been evaluated in the laboratory. Field studies have also been made, and have been reported. The loess in southern and northwestern Iowa has not yet been completely evaluated. Glacial till and associated materials in southern Iowa and the sand in areas associated with the Iowan drift plain are being studied. Neither of these last two has yet been

completed. The petrographic properties, such as mineralogical composition, particle size, sphericity, roundness, and surface area are determined for representative samples of the materials collected. Determinations are also made of cation exchange capacity, carbonates, organic matter content, pH, sulfates, chlorides, and free iron content. Engineering properties studies included the consistency limits, permeability, shearing strengths, moisture-density relationships, and the California Bearing Ratio. Several reports on property studies have been published.

### Stabilization Studies

After the determination of the properties, stabilization studies are conducted on representative samples to find ways for improving the engineering properties. Many inorganic and organic chemicals have been evaluated as stabilizing agents in preliminary studies. Studied in more detail are portland cement, bituminous materials (including cut-back asphalts and tars), lime, lime-fly ash, aniline-furfural, organic cationic compounds, and lignin.

Further tests, such as freezing and thawing and wetting and drying, have

been performed with the most promising material. Some of the investigations have been completed, and results have been reported to the Iowa Highway Research Board and national engineering groups. Three methods ready for field testing with Iowa soil materials are stabilization with portland cement, lime, and lime-fly ash. Another method showing promise is stabilization with organic cationic compounds.

• *Local Aggregate Utilization.* Parallel with this project is another which is a research to find ways of utilizing local materials in Iowa as aggregates and filler in asphalt pavements. The objective of the project is to find a method that will produce bituminous mixes with any ungraded material for roadway wearing surfaces. The Iowa Highway Research Board has made three grants for a total of \$163,150 for this project since 1952. The work being done is under the direction of Professor L. H. Csanyi of the Civil Engineering Department.

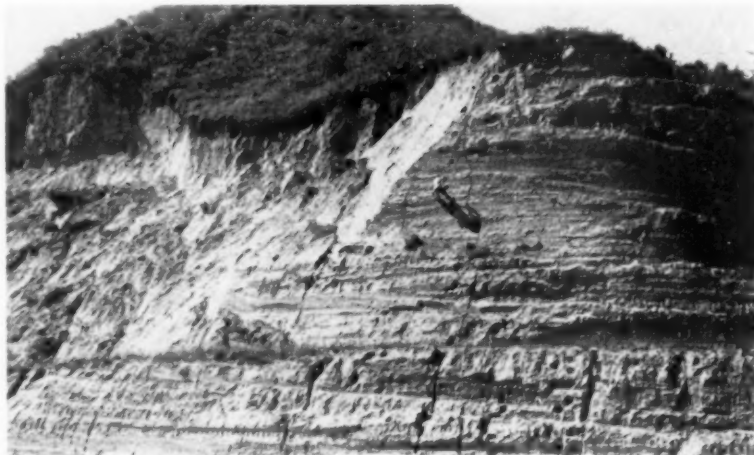
Several different methods of mixing asphalts with aggregates and binders were investigated, and one was chosen which could produce the desired results. Types of asphalt were tested for their suitability for the process and



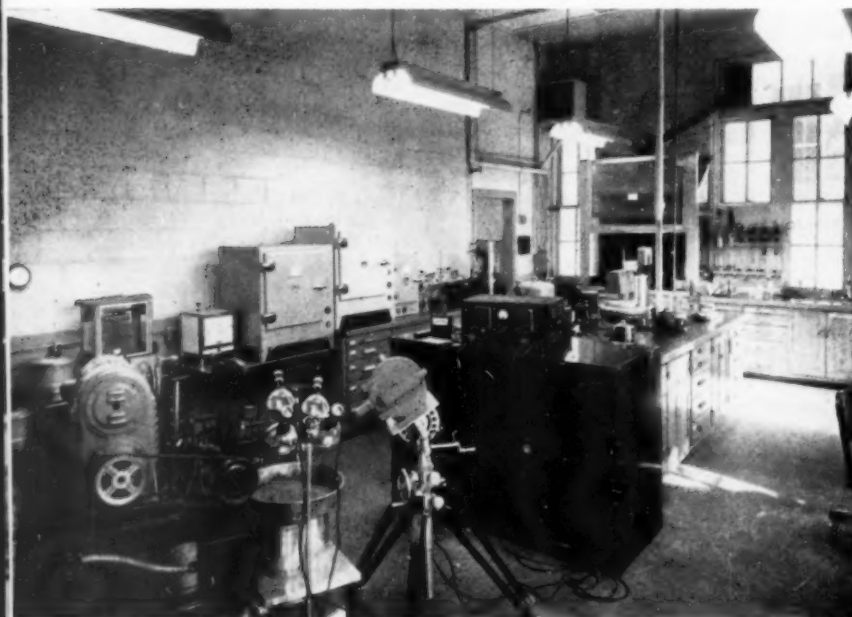
● Depth sampling of a loess cliff in Western Iowa. The suspension apparatus is a block and tackle from an aluminum beam anchored by a corkscrew soil auger.

their effect on the mix. In the early investigation, many local materials, such as blow sand, fine and coarse ungraded sand, gravel, crushed stone, fly ash, agricultural limestone and limestone dust, different types of soil including pulverized loess and dirt, all were tested to determine their possible use and the mixes that could be made with them. (Even crushed corncobs were given a trial as an aggregate. — Results were indifferent.) A method for pulverizing loess and dirt was developed so these materials could be used as filler in this type of asphalt mixes.

Mixes of asphalt and the selected materials were tested for application in highway pavement bases and surfaces, and a design method was developed.



● Suspended over a loess cliff the student assistant is taking depth samples at regular intervals. The samples are used in laboratory study.



● Bituminous research laboratory at Iowa State College. The Fastax camera is set to record nozzle characteristics.

As the last step in this first phase of the project, several test pavements were laid, using various types of local materials in combination with asphalt. The purpose of this was to find construction characteristics of the mixes. The pavements are also being checked for their resistance to the action of traffic over a period of time.

In the next phase of the project, other methods for securing satisfactory results were tested. New methods for analyzing asphalts were developed to make sure the process did not harm the asphalt. Various nozzles which might be used for introducing the asphalt were tested to find those best

suited for use with the local aggregates. These tests were made by using a Fastax high-speed 16mm. motion camera with pictures taken at 7000 frames per second, which is indeed high-speed photography. The pictures so taken "stop" the dispersion of the asphalt so that droplet shape and movement can be studied. The two nozzles best suited for the process were thus selected and put into use.

● **Test Project.** Results obtained indicate that a method has been developed for constructing low-cost, all-weather roads by using bituminous mixes containing local aggregates. An extensive test road eight miles in length will be laid in 1956. Six miles of the road is to be in Ringgold County on the southern edge of the state, and two miles is in Carroll County in the west central section.

The project has been extended in two ways since its beginning. One interesting application is the use of single shot penetration macadam as

*(Continued on page 68)*



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with AUSTIN-WESTERN All-Wheel Drive and All-Wheel Steer



**V-Plow** With All-Wheel Drive, there is plenty of power and traction for opening rounds—and especially important when thick crusts have formed on old snow.



**Snow Wing** Rear Steer makes it easy to maneuver around highway signs, or other obstructions; is also used to resist the side thrust of a heavy load on the wing.



**Bulldozer** All-Wheel Steer provides exceptional maneuverability under all conditions, and is also used to angle the blade on work like this, to shed the material sideways.



**Roller** Another attachment which often takes the place of a costly, single-purpose roller. It has many uses . . . on many materials, including gravel, blacktop and soil cement.



**Plainsman** Used for building new roads, widening old roads or raising grade elevations, this elevating grader can be attached or detached in a matter of minutes.



**Scarifier** Most popular of all attachments. All teeth are used for light work; while every other tooth can be removed for deep scarifying of hard material.

All-Wheel Drive for maximum mobility and 30 percent more Power-at-the-Blade—power that is made still more effective by Torque Converter drive. All-Wheel Steer for extreme maneuverability. Put them together and you

have teamwork that keeps Austin-Western Power Graders working where other graders fail. Austin-Western Works, Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Aurora, Illinois.

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**ROADS AND STREETS, October, 1956**

# Heltzel Portable Batchmaster

# Every



**JOB SITE** combination plants, designed to give you every batching advantage at the job location. They will cut truck time and wear enough to pay for themselves.



**READY-MIX** plants ideal for decentralization—spotting at new housing developments, etc.



**PIPE OR BLOCK** plants for job size concrete products manufacture; new business or auxiliary production.

# Plants for...

# Purpose



**PAVING** plants —  
both aggregate and cement  
—that have proved them-  
selves to be the finest yet  
engineered. True port-  
ability, plus unmatched  
speed and accuracy.

## HELTZEL PORTABLE BATCHMASTERS ARE SETTING PRODUCTION, ECONOMY RECORDS WHEREVER CONCRETE IS BATCHED

● Heltzel designs and builds the most complete line of portable plants in the industry. There's a plant of every size for every type batching. From the small 30 ton Highway Plant to the big 200 ton Paving Plants—for straight cement, straight aggregate or combinations—every Heltzel Batchmaster Portable is designed to go up fast and dismantle easily, with a minimum crew. They are sectionalized to be carried over the roads on standard carry-all equipment.

Don't buy any plant until you have talked with the owner of one of these new Batchmasters, for true portability is but one of many new features that make the Heltzel 1956 Line the fastest, most accurate and flexible plants on the market. And remember Batchmasters cost no more—so why not operate with the finest.

# HELTZEL

## BATCHING PLANTS



**THE HELTZEL STEEL FORM AND IRON COMPANY**  
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WARREN, OHIO

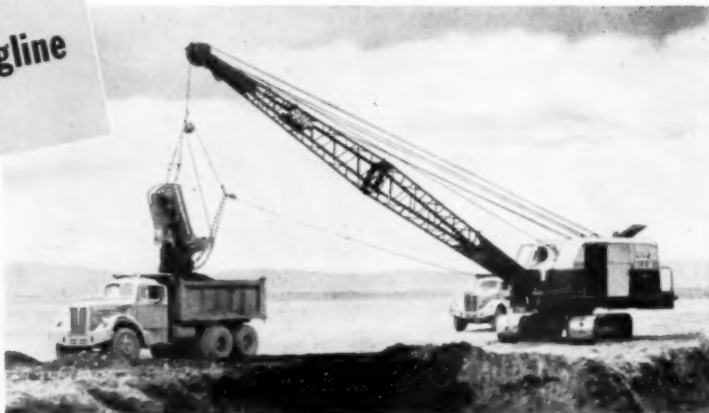
9896

... for more details circle 216, page 16

# DIGS A NEW LAKE IN 30 DAYS!

That's the record of this Bucyrus-Erie 1½-yd. dragline for Colorado contractor

Said Pioneer's operator of this dragline: "I have run many and like the 38-B best."



On a new highway near Monte Vista, Colo., the Pioneer Construction Co., Pueblo, Colo., excavated and loaded 45,000 cu. yd. of alluvial gravel in 30 days with a Bucyrus-Erie 38-B dragline. The excavation site is now a lake well stocked with fish.

The Pioneer Construction Co. was formed in January, 1955. Its growth reflects the wide experience and sound policies of the key men. They believe it takes the best of modern equipment, efficiently operated and properly main-

tained, to stay in business in contracting. Their experience with two Bucyrus-Erie 38-B's, one rigged as a dragline and the other as a shovel, has proved out this policy. These machines offer good production ability, and they are operated and maintained in a manner to provide economical performance.

Let your Bucyrus-Erie distributor give you complete details on these modern excavators—¾ to 4 cu. yd.—and show you how they can help bring top efficiency to your operations.

197E56

**BUCYRUS  
ERIE**

SOUTH MILWAUKEE

WISCONSIN

Pioneer's second Bucyrus-Erie 38-B, a 1½-yd. shovel working in another pit, also loaded out gravel at the rate of more than 1,500 yd. in 8 hours.





# WHAT DO TRUCKERS WANT MOST?



**FLEET OPERATOR:** "Our trucks must be on the job earning; not in the shop costing."



**MAINTENANCE MAN:** "My job is to hold truck operating and maintenance costs down to rock-bottom."

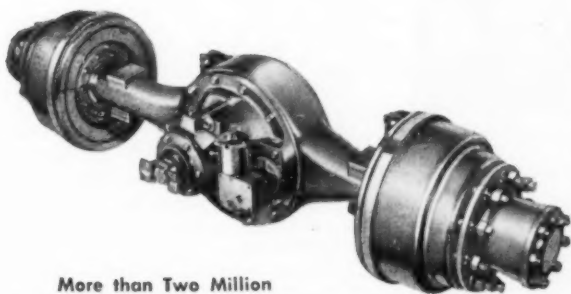


**FARMER:** "Quick trips with full loads often make the difference between profit and loss on a whole crop."



**CONTRACTOR:** "We need power for tough off-highway work; and speed to go on the open road."

## EATON 2-SPEED AXLES SATISFY THEM ALL!



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Eaton Axles in Trucks Today.  
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... for more details circle 201, page 16

ROADS AND STREETS, October, 1956



● The converted mixer used in preparing special bituminous mixes used in tests.



● Pulverizing equipment and the students and staff members employed in laying test pavements.

## Material Problems

(Continued from page 62)

pavement for farm feed lots. This development is being sponsored by the Engineering Experiment Station. The other extension of the project is to investigate the possibilities of slurry type bituminous mixes for single layer seal coats for surfacing stabilized bases and re-surfacing concrete and bituminous pavements.

● **Retaining Wall Design.** Lateral pressures on retaining walls is another study being conducted by an Iowa State College group of research engineers. This work is under the direction of Professor M. G. Spangler.

It is a continuation of work begun many years ago. Since many highways need retaining walls, the research has important implications for highway construction. The Iowa Highway Commission has given \$56,612 to this study since 1951. This research is being done on the campus of Iowa State College with walls of different heights and with more elaborate equipment and more accurate pressure measuring equipment. To measure the lateral or side pressures, which often topple highway embankments like the walls of Babylon, measurements are taken throughout the year, over many years. The study is directed specifically toward measurements of pressure caused by loads applied at the surface of the soil backfill be-

hind the wall. Results of these investigations are put to use as soon as they are secured.

● **Wing Wall Design.** The project to make an analytical and experimental investigation of bridge abutment wing walls has received \$24,137 in the last two years. Under the direction of Dr. William C. Alsmeyer of the Civil Engineering Department, analytical study is being done by approximate solution using the finite difference method. This method involves the solution of a number of simultaneous equations, which is done by an electronic computer. Two sets of equations have been solved by the computer at George Washington University. Other sets of equations will be solved to find moment contours for various ratios of heights to length of wing walls. From these contours bending moments of walls can be determined by extrapolation.

Investigation of published information and of answers to a questionnaire, which was sent to 20 names including state highway commissions, railway engineers, and engineering consulting firms, revealed that no information was available on the structural analysis of wing walls, as constructed by the Iowa Highway Commission.

## Special Aluminum Plates

Aluminum plates, rolled specially by the Alcoa plant at Bettendorf, Iowa, simulate the bridge abutment wing walls used by the Iowa Highway Commission to record loads. The plate is fitted with 120 SR-4 strain gauges, and deflections are measured under the plates with dial gauges.

The plates are vertically loaded with abrasive steel shot in cans and sand in plastic bags to represent the horizontal soil pressures to which wing walls are subjected. The loads are placed to register from zero on one free edge, representing the top of the wall, to a maximum on the inside corner between two fixed edges.

The work now being done is with constant thickness plates representing that type of walls. Later work will be done with plates of variable thickness. It is expected that some results may be available by July of this year.

● **Burned Shale Subbases.** The southern part of Iowa is especially lacking in gravel and sand for road building materials, but has an abundance of carbonaceous (bituminous) shale. The Iowa Highway Research Board is sponsoring a project for the investigation of these burned shales as subbase, base, and surfacing for roads. This research, to which \$60,839 has

been allocated in the past four years, is being done under the direction of Professor Charles O. Frush of the Chemical and Mining Engineering Department of Iowa State College.

The most readily available carbonaceous shale is exposed in open-pit coal mines, many of which are in southern Iowa. In addition, an almost unlimited supply of shale, shallow enough for open-pit mining, most of it under 35 to 50 ft. of glacial till surface, is to be found in many localities in Iowa. Many samples of material from 80 locations in the southern and central part of the state have been examined in the laboratory.

The shale samples are hauled by truck in lots of from 100 lb. to a whole truck load. In the laboratory, the shales are analyzed for fuel content. Then the samples are burned under controlled conditions, and each batch is tested for quality. The burning conditions are varied to find the best for each kind of shale. Each lot of burned shale is given a modified Los Angeles rattler test for resistance to abrasion.

After determining wear, the burned shale sample is tested for density to find how well it is likely to stay in place. For road construction use, a heavy, dense shale is desirable. Light weight shales desirable for insulation and light weight concrete have not been investigated in this research.

The physical structure of samples is determined by cutting masses of the burned material apart with a diamond saw and then examining the cut surfaces under both ultra-violet and natural light.

Freezing-and-thawing tests of the prepared materials will be made later as a part of the research.

### Purpose of Laboratory

The purpose of the laboratory work is to find shale products similar to stone or gravel, which can be used as aggregates with any type of binder or which can be used as sub-surface or surface materials.

A companion project to that on processing shales for highway use is the investigation of oils and tars from shales by Dr. L. K. Arnold of the Chemical and Mining Engineering Department. To this project, \$7,800 was allocated in 1954. The purpose of the investigation is to find what volatile materials are released as by-products in the burning of the shale material. Methods are being developed for the absorption and condensation of such by-products. And shale-

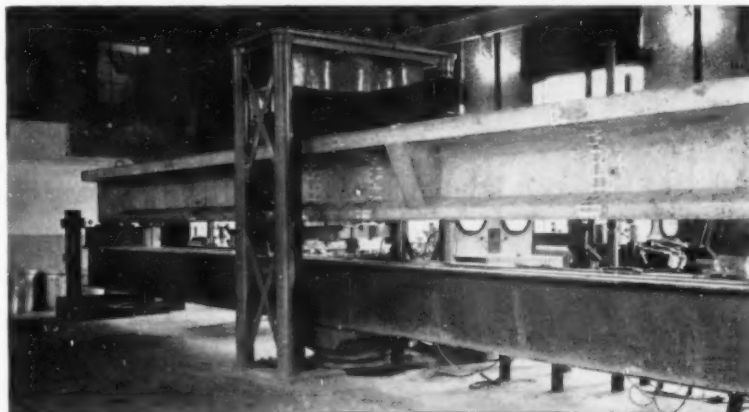
*(Continued on page 71)*



● Reinforced concrete retaining wall with 400 tons of backfill in place. Building beyond is instrument shed next to wall.



● Reinforced concrete retaining wall 10 ft. high, 36 ft. wide (main wall 20 ft. wide plus two 8 ft. wingwalls). Part of backfill is in place. Sand was placed adjacent to pressure cells.



● Beam in testing machine before tests were started. Note strain gauges at four cross-sections.



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Here are a few of the reasons why Shermans are used by so many cities and municipalities: Fast operating cycle, high visibility around other utility lines and easy maneuverability in constricted areas.

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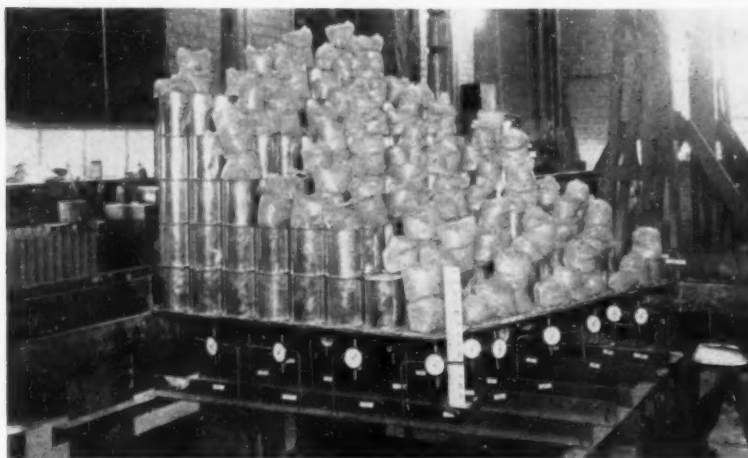
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● Aluminum plate, rolled specially by Alcoa at their Bettendorf, Iowa plant, with strain gauges in place.



● Plate loaded with cans of steel shot and plastic bags of sand to approximately 4,000 lb. to represent horizontal soil pressures on wingwalls.

## Material Problems

(Continued from page 69)

oil assays are being run to correlate such tests to amount of by-products produced by burning. The products from these shales are being compared with those from recognized valuable oil-shales.

● **Soil Moisture Movement.** The investigation of the movement of moisture through soils due to temperature differences, capillary forces, and to flow of electricity is continuing under the direction of Professor M. G. Spangler of the Civil Engineering Department. The sum of \$60,990 to be used for this research has been allocated since 1953.

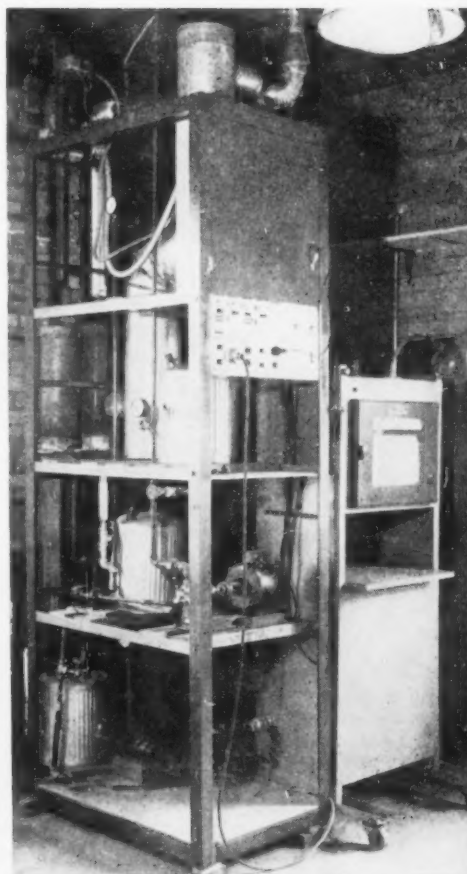
Under natural conditions, temperature differences exist in the earth's surface throughout the changing seasons of the year. These differences cause moisture accumulations beneath

an impervious surface, in addition to those caused by capillary action of the soil.

Accumulations of moisture are especially bad when water gathers in one place under pavement; for the pavement then may not be able to carry the load of traffic. This accounts for some of the breaking of pavement at some seasons of the year and not at others.

If methods can be found to control the moisture content, or if moisture content can be predicted, a more scientific approach to the design of impervious surfaces can be achieved. These methods are being developed in the research laboratory of the Engineering Experiment Station. Experiments have been set up to determine the basic factors influencing moisture movement due to electricity, capillary action, and temperature differences.

Once the moisture has accumulated, it is not likely to move out to any great extent in tight grained soils



● Apparatus for testing quantities of up to 10 lb. of shales under controlled temperature conditions. Also shown is the equipment for condensing unburned volatile material from the smoke.

by natural means and remains in the soil and makes it soft. This water, however, moves when an electric current passes through the soil, and the moisture content can be reduced by this process.

Experiments are being conducted to determine the basic factors and mechanisms involved in moisture transfer under thermal gradients. Apparatus has been designed for making a quantitative measurement of the movement of moisture due to a thermal gradient. Utilizing this apparatus, information can be gathered concerning the various factors influencing moisture migration such as porosity, soil mineral type, and temperature.

A large-scale field project has been set up at the college farm near Ankeny, Iowa to investigate moisture accumulations and movements under natural conditions, and to find out if it is technically and economically feasible

(Continued on page 74)



## How to get more out of your tractors

**STUDY POWER** ... Power is of prime importance, but, today, you need to consider engine horsepower as a *source*, not a "force". Maximum horsepower ratings considered alone are without meaning. Ratings must be studied across the speed range to measure their effectiveness in push-pull effort at desired operating speeds. Also, you need to check the smoothness with which power is applied; the time-factor in making a deep cut, and the difficulties in shifting which may discourage an operator from using the proper gear ratios to apply power with greatest time efficiency. Check, too, the percentage of time where you use the combination of power and traction for maximum push-pull. You will find power at maximum "drawbar" is seldom used for tractive effort. Since *all* tractors are able to spin their tracks or wheels in low gear on normal footing, horsepower should be considered only as a power source ... available for use in *any direction*. The most effective power combination lets you work at highest practical speeds which job conditions permit. (See table at right.)

**STUDY TRACTION** ... Pounds-pull is a combination of power *and* traction. Compare it ... but at *your* desired operating speeds. Usable pounds-pull results from many factors: type of material, conditions underfoot, weight of tractor, and forward speed. From the table at right, you can see that Tournatractor pounds-pull compares favorably with track-type tractors from 2.0 mph up. Even if Tournatractor takes a thinner initial cut, its time advantages in stepping up speeds, gives you a faster overall cycle. Wide-base rubber tires now available on Tournatractor can give still more traction on rubber. Its anti-friction drive and minimum of moving parts give you far less loss in power transmitted to ground-contact. It eliminates loss of power due to accumulation of mud and dust in tracks. Its compaction characteristics give a major advantage on fills and haul roads. Its low-pressure air-cushion and flexing rubber-treads can provide even better traction than crawlers in many materials. They permit work and travel without planking over pavement, curbs, and rocky footing.

**STUDY SPEED** ... Speed today is a major dimension in every piece of equipment you use. For years crawler engineers have struggled with this problem. They have made improvements, but find it difficult to overcome the friction-losses and wear-costs involved in stepping-up crawler speeds. With 4-wheel-drive, instant-shift, constant-mesh transmission, torque converter, instant controls, and anti-friction-drive, Tournatractor has a combination of speed factors not equalled by any crawler. With twice top-speed of heavy-duty crawlers, today's Tournatractor has many other savings in each cycle that contribute to its *speed* performance. You've seen the load build up on a crawler's blade, but have you checked the other components of the crawler's day? Carrying-the-load, spread, return, wait-and-travel time, are all part of your cost and call for long-term time-study. Figure, too, the few times where crawler maximum-drawbar at low speed gives you a production advantage; then compare with the much larger time percentage where extra speed can pay off in profit.

**STUDY MOBILITY** ... Crawler-moves, job-to-job, or from section to section, require moving in of truck and flatbed, loading and unloading time, plus actual travel-time. These high moving costs make crawlers expensive on hit-and-run assignments. Yet today's large-area contracts need far more equipment movement than ever before. Tournatractor can be at work a mile away in less than 5 minutes ... lets your pushers be as flexible as your prime-mover scrapers when moving to a new area ... for instance, to work drier borrow during wet weather. Mobility also gives you flexibility to quickly balance pushers as well as scrapers when hauls vary. It lets you use idle time to improve haul roads, detours, or drainage. It makes quickly available ripper, stumper, or compaction serv-

ice anywhere on your project. Mobility is an important dimension in today's dirtmoving ... will be more important in your larger future. Think it over, remember some of your last year's projects and count the times when a 17.4 mph tractor could have saved you money and given you bigger profits.

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Rubber-tired Tournatractor travels and works over any type of footing to clear land, push-load scrapers, dig ditches, spread fill, stock-pile materials, maintain haul roads, backfill around culverts, pull rippers, rollers and other equipment. The best way to judge today's improved Tournatractor is to see it in action on one of your own jobs. Call or write us today for a demonstration of this machine. Compare its profit possibilities with your present heavy-duty tractor equipment.

## Time study production relationship of pull to speed

TRACTOR	HP with torque converter	Speeds in MPH		Pounds of pulling effort			
		Forward	Reverse	1.5 mph	2.0 mph	2.5 mph	3.0 mph
CAT D8	191	0 to 3.6 low 0 to 7.4 high	0 to 3.6 low 0 to 7.4 high	30,000	24,000	18,000	15,000
IH TD24	200	0 to 7.6	0 to 6.6	32,500	22,500	18,000	15,000
TOURNATRACTOR	208	0 to 17.4	0 to 7.3	24,700	23,500	18,800	15,650
AC HD21	204	0 to 3.0 low 0 to 7.5 high	0 to 5.5	Pounds-pull curve not shown in manufacturer's literature available to us.			

Note: Figures taken from manufacturers' specification sheets available to us at time of printing.

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... for more details circle 233, page 16



## Materials Problems

(Continued from page 71)

ible to control moisture under impervious surfaces.

On the college farm, an impervious asphalt-type surface cover has been placed over an area of approximately one-half acre. Records are maintained of the water table, and moisture determinations are made periodically to determine the changes in moisture conditions down to the water table under the cover. Records are maintained of the temperature changes at various locations down to 10 ft. below the surface. Fluctuations in the moisture content and temperature are determined. One object of this study is to ascertain if, under natural field conditions, the theoretical moisture distribution compares with the conditions existing under natural conditions in the field. If the characteristics of the soil profile are known, it is possible to determine the theoretical soil moisture distribution from the level of water table up to the impervious surface.

The research has not reached a state where conclusions can be drawn. Both the laboratory research and the field investigations are being continued.

• **Prestressed Concrete.** Research on pre-stressed concrete has received two allocations totaling \$8,367 since 1952. The first work was on the theory of the behavior of pre-stressed concrete slabs. More recent work, done under the direction of Dr. C. L. Hulsbos of the Civil Engineering Department was the testing of a composite 42½ ft., 5 ton, pre-stressed concrete bridge beam.

Such beams have long been used in Europe, and more recently in the eastern part of the United States, but only a few have been manufactured in Iowa. In 1952, the Iowa Highway Commission worked out a standard design for a beam of this kind, and several have been used in bridges on secondary roads.

The specimen tested was made by Pre-Stressed Concrete of Iowa, Inc., an Iowa Falls concern. To make such a beam, 30 wire cables of high strength steel are strung lengthwise in the concrete form. A force of 294,000 lb. stretches the cables some 3 in. The concrete is poured, and after it has set the cables are cut away from the forms at the ends. The stretch in the cables pulls the concrete into compression.

The beam was tested in a machine capable of applying a force of 400,000 lb. After being placed in the ma-

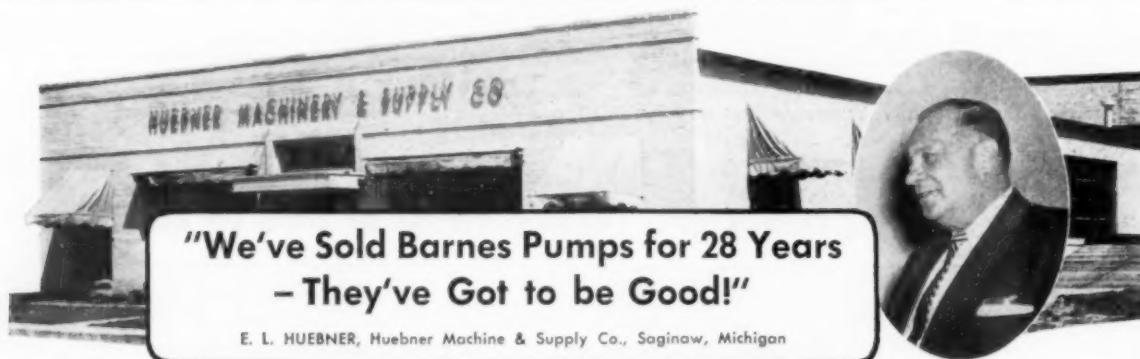
chine, the beam was topped with a 6 in., 3 ft. wide concrete slab.

Electrical strain gauges were attached to the surface of the concrete at 80 points on the length of the beam. These gauges showed the distribution of strain at four cross sections and determined the load at which cracks first occurred in the beam. A large number of strain and deflection measurements were taken on the composite member during the latter part of the summer.

In the final test the beam depressed 12 in. in the center before the ultimate load of over 108,000 lb. had been reached. This load was almost five times the design live load. The beam was not deflected enough to cause collapse. When the load was entirely removed, the beam had a permanent deflection of 3.6 in., and a large number of cracks were visible over the middle half of the span.

Final tests were observed by the members of the Iowa Highway Commission and a number of other interested observers.

Preliminary examination of the test data indicates close agreement between actual performance and behavior predicted from theoretical analysis. A complete report will be submitted to the Iowa Highway Research Board early in 1956.



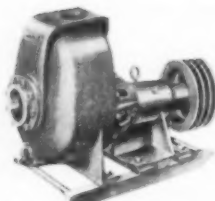
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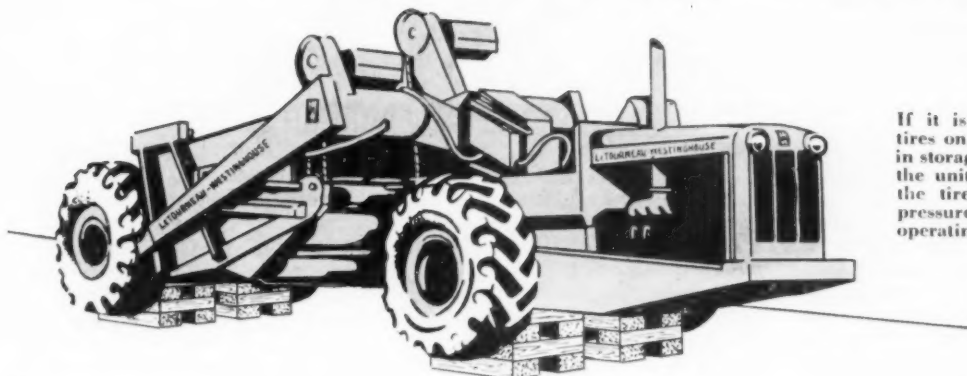


... for more details circle 185, page 16

**ROADS AND STREETS, October, 1956**



# Tips on how to store rubber tires and tubes



If it is necessary to leave tires on a machine which is in storage, jack up and block the unit to take weight off the tires. Reduce tire air-pressure to 50% of normal operating pressure.

**T**ime alone does not make unprotected rubber deteriorate. Far more important are the ill effects of light, heat, moisture, ventilation, ozone, oils, dust and dirt.

Here are some precautions that will help you store tires without damage:

1. Temperatures between 40 and 60 degrees F are the best for rubber products. Always protect stored tires and tubes from heating radiators and other sources of heat.

2. Keep store rooms dry. If any tires get wet on the inside, dry them thoroughly before they are used.

3. Do not expose tires to light. Cover glass skylights and windows with dark, opaque paint. Close doors and other openings through which light could enter.

4. If the floor cannot be cleaned properly, lay a foundation of clean wood strips one-half to three-quarters-inch thick under the tires. Do not oil or polish floors.

5. Cover tires with heavy building paper, a tarpaulin, or some other heavy, tightly-woven fabric, to prevent dirt from getting inside.

6. Keep tires away from motors, generators, switches, or other electrical devices. These instruments discharge ozone, which speeds the oxidation of rubber.

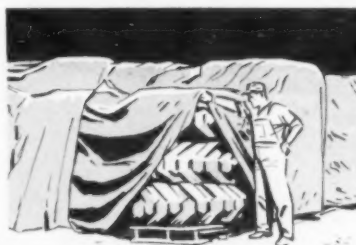
7. Shield tires from drafts. Air-currents replenish oxygen, and oxygen is harmful to rubber.

... for more details circle 234, page 16

8. Do not store tires in the same or adjoining rooms with gasoline or lubricants. Rubber readily absorbs vapors from these fluids, becoming weakened and damaged.

9. Pile tires of the same size together. Do not pile them so high that the tires on the bottom are crushed.

10. Protect tires that must remain outdoors by a cover or wrapping of heavy canvas or similar weatherproof material. It is useless to paint tires, for painting does not give proper protection.



If tires are stored outside, first lay a foundation of clean wood strips and then cover stored tires with paper, tarpaulin, or heavy, tightly-woven fabric.

11. When storing mounted used tires, reduce inflation to half of normal pressure and pile in stacks not higher than five feet.

12. If it is necessary to store used tires while mounted on a vehicle, jack up the axles and block them so the weight of the vehicle does not rest on the tires. Reduce air in the tires to 50 per cent of normal operating pressure.

## Storing tubes

Tubes must be handled with even greater care than tires.

1. Choose a dry, cool, draft-free storage place just as you would for tires.

2. Leave tubes in their original packages, when possible. Never inflate tubes before storing.

3. Remove used tubes from tires and completely deflate by removing valve cores.

4. Fold used tubes carefully to avoid sharp kinks. Do not pile tubes in such a way that the weight will cause creasing along the folds.

These suggestions will be helpful whether you plan to store tires and tubes for prolonged periods or relatively short times.

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G-743-OP-b

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## Technical Digest

By John C. Black

### Four types of prestressed concrete compared

"The investigation reported here was conducted with the primary objective of providing a comparison with respect to behavior at high loads and ultimate strength of structural concrete beams in which the type of reinforcement varied."

The steel in prestressed concrete receives its stress either by bonded contact throughout its length or from end anchorages without intervening bond. Bonding occurs when concrete is cast directly around steel under "pre-tension" stress, or by grout-filling the space between steel and concrete in a pre-cast, "post-tensioned" unit. Conventional reinforcement also is stressed through bond. In pre-cast post-tensioned beams without grouting, stress is transmitted from end anchorages only.

Bending tests were conducted on 19 beams in the following groups —

- (1) 3 beams with pre-tension steel bonded in original concrete.
- (2) 3 beams with post-tension steel grouted to original concrete.
- (3) 5 beams with post-tension steel unbonded to concrete.
- (4) 3 beams with post-tension steel unbonded but with conventional deformed bars added.
- (5) 5 conventionally reinforced beams (no prestress).

All specimens were 6 x 12 in. in cross sections, 10 ft. long, and tested with third-point loading over a 9-ft. span. Ultimate loads, mode of failure, load-deflection characteristics, and recovery properties were observed. Concrete and steel strains were recorded.

Observations on ultimate strength include the following —

All conventional reinforcement yielded before the ultimate moment was reached.

Only in the lightly reinforced pre-tensioned beam, was the yield strength of the strands developed at failure. The remaining bonded beams failed by crushing of the concrete compression zone at strand stresses below the yield strength.

All unbonded prestressed beams failed by concrete crushing at lower strand stresses than corresponding beams.

The average measured ultimate moment of two bonded beams corresponding to three of the unbonded beams exceeded the measured ultimate moments of these unbonded beams by 39, 26, and 21%, respectively. "It is again important to note that these percentages refer to tests carried out with third-point loading over a span 13 times the effective beam depth and with an effective prestress of about 120 ksi. Had the span been longer, the loading been concentrated closer to midspan, or had the prestress been lower, the strength of bonded beams would most probably have exceeded that of similar unbonded beams by a greater percentage."

"In each of the three beams in group 4, one unbonded strand was replaced by two #4 deformed bars. The force in the two bars stressed to their yield point is nearly equal to the force in one  $\frac{1}{2}$ -in. strand stressed to its yield strength. Fig. 7 indicates that such replacement increased the ultimate strength of the unbonded beams." This point is discussed and certain possibilities are noted.

"The strengths of the pre-tensioned and the corresponding post-tensioned

(Continued on page 80)

### Job Site Pickup . . . Job Right Delivery

Southern Tire representatives pick up your worn tires at your job site after work hours, and return them guaranteed to equal new tire mileage . . . job right for long service!

You save the expense of equipment downtime, plus savings of 40% or more compared to the cost of new tires, when you specify Southern Tire's Retreading Service.

Let Southern Tire's retread specialists and superior facilities help you save time and money. Call your favorite dealer and specify Southern Tire Retreads.



### Southern Tire's GIANT TIRE RETREADING

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All sizes from 1100x24 to 2700x33, and new sizes 29.5x25 and 29.5x29.

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- Three-Sectional molds assure no buffing to breaker strips, regardless of growth.



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# SOUTHERN TIRE COMPANY



... for more details circle 258, page 16

Traveloader loads up to 600 yards per hour from stockpiles... moves and maneuvers fast to fill orders for material of various specifications... keeps big truck-fleet working steadily.

Cross-conveyor (optional), shiftable left and right, directs material to trucks at either side... speeds loading, cuts positioning time, balances load.



passing traffic... loads excess material from streets and between foundations in subdivisions.

**STRIPS TOPSOIL:** Traveloader cuts and loads topsoil and other materials from field or natural bank without prior preparation.

#### These features cut your costs:

Power feeder on Traveloader gathers material from a width of 8' and places it on conveyor belt. Machine has 5 working speeds, 0.29 to 1.9 mph... travel speeds to 26.7 mph. Conveyor discharge height is adjustable from cab for filling trucks of any height without spillage... without excessive dust. Traveloader heaps trucks at its rear, or with optional cross-conveyor, at either side... evenly distributes full load for fast over-the-road haul.

Cab is centered over conveyor — out of the dust zone — where visibility of material, feeder, conveyor, and trucks is good. Positive, convenient controls make loading simple... maneuvering and traveling as easy as driving a truck. Traveloader is powered by either 55 hp gasoline or 60 hp diesel engine, machine weighs 16,700 lbs.

#### See Traveloader at work

Make a date to see Traveloader in action. See it load at the rate of a-truck-a-minute (including truck positioning time). That's the best way to appreciate its money-making possibilities on your work. Write or phone us for the names of users working Traveloader on projects similar to yours.

## Cut truck-loading costs!

### Speed handling of aggregates, loose dirt, topsoil with fast-loading Traveloader

What is it costing you to load aggregates, surplus dirt, and other loose materials into trucks? Are you loading fast enough to keep your haulers busy? ... to keep ahead of pavers? ... to keep your jobs on schedule? You may find it worthwhile to re-examine your truck-loading methods carefully, then figure out where you might save time and money with a high-speed, rubber-tired Adams Traveloader.

#### Handles big yardage fast

Traveloader loads a truck in less than a minute from windrow, stockpile, or bank. It loads up to 600 yards per hour — dirt, sand, gravel, crushed stone, slag, topsoil, cinders, snow, and many other non-packed materials.

Here are a few typical applications where mobile Traveloader heaps trucks faster at lower cost:

**LOADS AGGREGATES:** Traveloader handles materials from stockpiles at aggregate plants, in materials yards, or

rail-heads, for transport to ready-mix plant or job. Machine reduces truck waiting time... loads trucks in 40 to 60 seconds... moves and maneuvers quickly from one job to another at loading site... travels fast between plants and yards.

**LOADS SURPLUS DIRT:** Traveloader picks up windrowed dirt in continuous motion, without scattering material. It works on road shoulders, loading to the rear... does not interfere with



Traveloader digs and loads topsoil, sand, gravel, and other materials from natural bank without prior preparation.



Making clean 8' wide pick-up, Traveloader loads surplus material windrowed on road shoulder, without interference to passing traffic.

AL-1105-H-b



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See you at the ROAD SHOW • Chicago • January 28-February 2, 1957

... for more details circle 235, page 16

This network of ramps, takeoffs and highway composes the three mile stretch of New Jersey Turnpike extension worked by Geo. M. Brewster & Son, Inc.

# "Flex-plane

## .....makes the

**REMARKABLE SELF-WIDENING FINISHER**

**MAKES SMOOTH WORK OF COMPLEX HOLLAND TUNNEL**

**EXTENSION OF JERSEY PIKE!**



Flex-Plane's Triple Lap Frame provides unsurpassed steadiness even at its widest width. Here machine works 23' slab in extended position.

"There's only one machine that could have done this job," states Byron Craig, Paving Superintendent of Geo. M. Brewster & Son, Inc., "and that is Flex-Plane's Self Widening Finisher."

The job Byron Craig was talking about is the Newark Bay-Hudson County Extension of the New Jersey Turnpike, a three mile stretch of ramps, turnoffs, interchange lanes and service area cutoffs that connects the busy toll road with the Holland Tunnel.

"This job was a real challenge," continues Craig, "A typical pour would range from 4' to 14½' to 19', back to 15' - 8", then up again to 23'. The Flex-Plane Self Widener worked these variable width slabs as easily as though it were a straight pour. What's more I find Flex-Plane builds a 'paving man's' machine. It's strong and sturdy at its widest width, and it comes in a width selection that makes sense."

You'll find most leading paving firms own Flex-Plane finishers. It's the most popular finishing machine ever built. If you are in the market for finishing equipment let us put you in touch with a contractor in your area who'll convince you there's absolutely nothing to match it.



**THE FLEXIBLE ROAD JOINT MACHINE CO.**

**9000 THOMAS ROAD, WARREN, OHIO**

10083

**WORLD'S LARGEST MANUFACTURERS OF CONCRETE FINISHING EQUIPMENT**



# difference"

Byron Craig, Paving Superintendent, shows type of progress chart he used to map pours.



▲ Typical slab section. Note unusual tapering. Brewster was able to maintain above average pour with a single Flex-Plane machine without a spreader.

Here machine works narrow take off strip in contracted position. Three mile stretch had 10 such strips plus 8 ramps and one underpass. ▶



... for more details circle 203, page 16

## Technical Digest

(Continued from page 76)

bonded beams tested were nearly equal, and 20 to 40% higher than the strength of the corresponding unbonded post-tensioned beams."

"Over the entire range of loading, the prestressed beams were more elastic than the conventionally reinforced beams with respect to recovery after removal of loads. The recovery of the prestressed beams was about 90% for load releases up to 85% of the ultimate load. Conventionally reinforced beams recovered about 70% in the working load range and about 80% at high loads."

"Ultimate Flexural Strength of Prestressed and Conventionally Reinforced Concrete Beams" by Jack R. Janney, Development Engineer; Eivind Hognestad, Manager Structural Development Section; and Douglas McHenry, Director of Development; Research and Development Division Portland Cement Association, Chicago, Ill. JOURNAL OF THE AMERICAN CONCRETE INSTITUTE, 18963 W. McNichols Rd., Detroit 19, Michigan, February, 1956. Reprints of this paper 50 cents each.

## Blasting charge explosion during thunderstorms

Some fairly simple measures are useful in greatly reducing one of the dangers attending mining in stormy areas; that is, premature detonation of explosive charges provided with electric firing caps, caused by atmospheric electric discharges. That this is a very real danger is proved by the discomfort miners experience during storms.

Electrical discharges can cause explosives to detonate:

1. When striking at the entry to a gallery and running down it along metal conductors or rail trucks;
2. By setting up induced currents in the electrical detonation circuit, acting as an oscillating circuit;
3. By setting up potential differences between ground and metal conductors in the inner dry areas of the mine. These lines generally have a good electrical contact with the ground area around the entry to the mine, and are therefore influenced by the changes in potential which occur in that area, whereas they have bad contact or are insulated from the inner part of the galleries which run through dry ground and are bad conductors.

The two former phenomena are less

dangerous, since the first is very rare and the second confined to work in the open on account of the screening effect of the ground; the third is likely to cause the greatest number of accidents. The danger area may in this case cover a radius of several kilometers from the entry to the mine, specially if there are telfers with stations in the vicinity of the entry. Those are easy prey for electrical discharges. In this case an accident may be caused by the following conditions: assuming that an explosive charge hole has already been filled and that the electric firing cap is already placed, it may happen that one of the two wires from the cap comes into contact, either directly, or through a mining tool, or through the water used to clear the charge hole, with a rail track or a metal pipe at high potential. Since the shell of the cap is insulated from the wires, a spark will occur between the ignition coil and the cap shell sufficient to cause explosion.

From T. MICHELETTI, *Le ripercussioni in sotterraneo delle scariche elettriche atmosferiche*, "L'industria mineraria" (Italy) 5, (12) December 1954, 713-718 (in Italian), as digested by European Productivity Agency, Organization for European Economic Cooperation.



## GARRISON power steering gives agility to LORAIN'S rugged 4-AXLE MOTO-CRANE!

Garrison Power Steering is standard equipment on this big, four-axle 8-wheel (8x4) Lorain Moto-Crane, available in 22½, 25, 30 and 35 ton models.

The tandem front axles supply 4 tires to improve front end weight distribution and thus better the machine flotation and maneuverability for off-the-road and on-the-job travel. The 4 front wheels are steered simultaneously and in the correct geometry for proper tracking... such steering is accomplished with only slight pressure on the steering wheel... thanks to Garrison Power Steering.

With hydraulic power doing 80% of the work of turning, operators tire less easily, do more work in a day's time. Important, too, shock from rubble, rough ground, etc., is absorbed by the hydraulic booster, adding life to the steering mechanism.

Since Garrison Power Steering is available as optional equipment on all Lorain Cranes where it is not standard equipment, why not make sure you get its advantages on your next rig?

**GARRISON**  
Manufacturing Co.

**POWER STEERING KITS AVAILABLE**—Garrison Power Steering is available as optional equipment on most makes and models of trucks, wheeled off-the-road equipment, and tractors, and material handling equipment. Write for complete information.

4609 E. Sheila Street, Los Angeles 23, California  
... for more details circle 274, page 16

**ROADS AND STREETS, October, 1956**

# How Rented Snow Trucks Help Ice and Snow Work

Illustrating how privately-owned equipment has been used on a business-like basis to augment the state's plowing and sanding fleet. Truck owners have responded well in this program, which has proved mutually profitable in meeting unusually bad winter conditions.

**By James W. Maher**

Acting Engineer of Roadway Maintenance  
Connecticut State Highway Department, Hartford

**T**HE Connecticut state highway department in August of 1955 — for the fourth year — advertised for bids from truck owners for machines to help with snow and removal on the highways.

The basis of work was that the owner would receive assignments from the district's general highway foreman, the equipment to be ready for mounting attachments by November 1, 1955. The truck together with driver and a laborer had to be kept available at all times — week-ends and holidays included — until April 15, with attachment in place. Some of the details of this very satisfactory arrangement are here reviewed.

The quotation sheet used in bidding has two main headings. One is for truck with underframe, hoist and moldboard designed to be used with state-specification plow blades. Also flashing cab lights and adjusted headlights. The state furnishes and maintains the sand spreader attachment.

The other heading is for trucks for which the state furnishes all attachments, the contractor however being required to maintain them. For either class of service, the truck owner also furnishes all fuel, repairs, chains, specified insurance, and taxes. The state may add personnel of its own to the driver and laborer furnished, while the contractor must expect to supply relief drivers during prolonged emergencies; otherwise, keep the same driver with a given truck at all times. The contractor's men load sand from designated state stockpiles.

The rental period, as described in detail on the bid sheet, includes a

guaranteed four-hour minimum work period away from the owner's garage. Two hours' time is allowed for the truck to appear on his route after being called, after which a penalty of \$25 per hour of delay is applied for the first two hours and higher penalty thereafter. Travel time to and from owner's garage is usually agreed on in advance. A performance bond of \$2,500 per truck is required.

The owner is not paid during truck breakdowns occurring during work periods. Each truck is inspected by state personnel before acceptance. Particular attention is paid to the ability of the springs to take the weight and impact of plow and hoist; and rear tires must have adequate clearance from body or springs, to permit putting on of chains, single or dual. All trucks must have air brakes with sufficient air reserve for plow operation; defrosters, etc.; and must weigh a minimum of 26,000 lb. gross vehicle weight. The truck is usually assigned to locations within 25 miles of the owner's garage.

Shown here are data on the 87 trucks thus hired for snow and ice work during the 1955-56 season. This represents a marked increase in rentals over previous Connecticut experience, reflecting the unusual severity of the 1955-56 winter and increased demand of the traveling public, as well as the increased mileage of the state system as incorporated by the 1955 General Assembly. Another factor in this increase was the additional state in-

## Costs of Rental of Trucks (With Labor) For Winter of 1955-56

*Maintenance District 1, only — Similar Figures in Other Districts*

Vendor	Regular Hours	Overtime Hours	Total Hours	Cost
James D. Aeto & Sons	58½	146½	205	\$ 1,962.25
Raymond Barnes	96½	290½	387	4,451.00
Chas. Bowen, No. 1	103½	243	346½	3,291.75
Chas. Bowen, No. 2	124	248	372	3,591.00
Butler Sand Service	66½	170	236½	2,889.75
Chadwick Excavating, No. 1	88½	229	317½	3,667.64
Chadwick Excavating, No. 2	89	233	322	3,720.56
E. Gasparri Const., No. 1	103½	257	360½	4,042.25
E. Gasparri Const., No. 2	89½	231½	321	3,602.00
E. P. Granger & Sons	87	245½	332½	3,570.50
Burton C. Hall, No. 1	147	301	448	3,584.00
Burton C. Hall, No. 2	137½	280½	418	3,344.00
Kement Const. Co., No. 1	82½	223	305½	3,806.50
Kement Const. Co., No. 2	84	230½	314½	3,920.50
Kement Const. Co., No. 3	90½	253½	344	4,290.50
R. Lindemark	89	228	317	3,626.00
Paul McMahon	88	228½	316½	3,393.50
W. R. Miller	83	225½	308½	3,227.50
Seminola Const.	49½	81½	131	1,554.50
Welch Const. Co., No. 1	118½	339	457½	5,253.00
Welch Const. Co., No. 2	122½	338	460½	5,281.00
Zajicek Const. Co.	65	185½	250½	2,189.50
<b>TOTALS — 22 trucks</b>	<b>2063½</b>	<b>5208½</b>	<b>7272</b>	<b>\$78,259.20</b>

**CONTRACT PROPOSAL** Please read carefully

STATE OF CONNECTICUT  
DEPARTMENT OF FINANCE AND CONTROL  
SUPERVISOR OF PURCHASES  
70 Arch Street Hartford, Conn.

Form SP-6-Rev. 6-54

**THIS FORM MUST BE RETURNED**

Bid No. 556-A-1368 C	Issued 12-5-55	Date of Bid Opening Dec. 13, 1955	Time of Bid Opening 10:00 A.M., E.S.T.	Amount of Bid Security NONE REQUIRED
Name 9948 RENTAL OF TRUCKS For CONNECTICUT STATE HIGHWAY DEPARTMENT Contract Period or Date Delivery Required 1955 - 1956 WINTER SEASON				

**INVITATION TO BID**

Pursuant to the provisions of Section 252 of the General Statutes of Connecticut, Revision of 1949, sealed proposals will be received by the Supervisor of Purchases for the State of Connecticut, at 70 Arch Street, Hartford, for furnishing the commodities and/or services herein listed to state agencies.

**AFFIRMATION OF BIDDER**

The undersigned bidder affirms and declares:

- That this proposal is executed and signed by said bidder with full knowledge and acceptance of the provisions of Form SP-6, Revised effective July 1, 1954, entitled Standard Bid and Contract Terms and Conditions, which "Form SP-6, Revised effective July 1, 1954, together with the Commodity Specification, Proposal Schedule, and Special Bid, and Contract Terms and Conditions" are made a part of the contract.
- That should any part of this proposal be accepted in writing by the Supervisor of Purchases within thirty (30) calendar days from the date of bid opening unless an earlier date for acceptance is specified by bidder in proposal schedule, said bidder will furnish and deliver the commodities and/or services for which this proposal is made, in the quantities and at the prices bid, and in compliance with the provisions of the STANDARD BID AND CONTRACT TERMS AND CONDITIONS, COMMODITY SPECIFICATION, PROPOSAL SCHEDULE AND SPECIAL BID AND CONTRACT TERMS AND CONDITIONS, should award of any part of this proposal be delayed beyond the period of thirty (30) days or an earlier date specified by bidder in proposal schedule, such award shall be conditioned upon bidder's acceptance.
- That this proposal is covered by surety in the following form as checked:  
☐ ANNUAL PROPOSAL BOND ON FILE WITH THE SUPERVISOR OF PURCHASES.  
☐ PROPOSAL BOND ENCLOSED IN THE AMOUNT OF \$.....  
☐ CERTIFIED CHECK ENCLOSED IN THE AMOUNT OF \$..... (See Amount of Bid Surety above if required)

**PROPOSAL** The undersigned, accepting the conditions set forth herein, hereby agrees in strict accordance therewith, to furnish and deliver the commodities and/or services to the state agency or agencies named in the PROPOSAL SCHEDULE at the prices bid therein.

Signature of Bidder (Print Name of Individual) \_\_\_\_\_  
 Title \_\_\_\_\_  
 Business Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_

- Proposal sheet used in tendering bids for truck rental on Connecticut winter highway maintenance.

stitutional work requiring several extra trucks. One district alone incurred over \$7,000 in rentals involving 28 recoverable work orders, for clearing parking areas, driveways, etc.

Accompanying these notes is a sample of the proposal sheet. Also data on rental hours, for a typical district last winter and summarized state-wide for the past four winters.

There were plenty of bidders on the 1955-56 work at prices ranging from \$7.50 to \$10 per hour including driver, laborer and operating cost. Truck rentals in all totaled \$293,000 during the past winter, which represented a relatively minor but very effective part of this department's winter service to highway users.

## Portland Cement Assn. expands organization

The Portland Cement Association has announced an expansion of its field services to cement users. A new regional office is being opened in Los Angeles to supervise activities of the Los Angeles and Seattle, Wash., district offices, and new district offices opened in Baltimore, Md., Trenton, N.J., Portland, Me., and Louisville, Ky. Personnel are being added or transferred to several of the other 28 district offices and all four of the other regional offices.

Purpose of the expansion is to make available on a more localized basis, the services of experienced highway,

structural and conservation engineers and experts in the use of concrete for farm and home construction. Expansion is planned particularly in the heavily populated eastern states, according to G. Donald Kennedy, PCA president. Some of the details:

- A total of 14 senior highway, structural and soil-cement engineers and construction superintendents, formerly working out of Chicago headquarters, have been transferred to regional offices in New York, Chicago, Atlanta and Kansas City, Mo.

- Hugh Barnes becomes regional manager at 816 West Fifth Street, Los Angeles. Succeeding him as district engineer at Los Angeles is John M. McNeerney who was PCA's statewide paving engineer for California.

- Four Association field engineers have been advanced to become district engineers at new offices: Daniel Webster at Portland, Me. (142 High St.); Albert L. Blackwell at Trenton; William J. Moore at Baltimore (Keyser Bldg.); and J. J. Farra at Louisville (Commonwealth Bldg.)

Formation of the three new offices in the East will allow the other district offices in that region to concen-



● Albert L. Blackwell, district engineer of the new PCA office in Trenton.

trate their activities and give better service in the states they cover. The Philadelphia and New York offices will devote their activities entirely to Pennsylvania and New York respectively. Each formerly served three states. The present Boston office will handle activities in Connecticut, Massachusetts and Rhode Island.

The district offices serve as clearing houses for the latest information on construction, design and research advances, and provide technical information and educational services aimed at the best possible utilization of cement and concrete.

## Hired Trucks and Hours Worked in Connecticut's Winter Maintenance

Maint. Dist.	1952-53		1953-54		1954-55		1955-56	
	Trucks	Hours	Trucks	Hours	Trucks	Hours	Trucks	Hours
1.....	19	3,102	21	2,275	23	3,144½	22	7,272
2.....	21	2,940	22	3,594	24	3,346½	26	9,118½
3.....	18	2,610	24	3,255	24	2,732¾	27	8,807
4.....	6	1,203	5	857	7	1,295¼	12	4,239
	64	9,855	72	9,981	78	10,519	87	29,437½

Number of storms requiring reports:

1952-53	1953-54	1954-55	1955-56
16	14	18	45





## NEW SUPER MILEAGE LUG TIRE CUTS YOUR HAULING COSTS

**PULLS BETTER OFF ROAD, TOO!**

Here is a new Firestone tire that will cut your operating costs to the barest minimum.

On hard paving, its deep-ribbed, wide center treads move along smoothly without the tire-wearing, equipment-killing vibrations so often set up by ordinary type heavy-duty tires. As a result, you get more original tread miles. And, heavy lug bars give you all the pulling power you need for off-the-road duty.

Firestone Super Mileage Lug tires have 60% deeper tread to give you more low-cost miles. More than that—they are built with husky, Safety-Tensioned Gum-Dipped® cord bodies. This exclusive Firestone process gives a stronger tire body and makes it possible to get more retreads on every tire.

Any way you look at it, you'll save money with Firestone Super Mileage Lug tires! If you operate dump trucks, cement mixers, logging, mining or any other heavy-duty trucks, it will pay you to contact your Firestone Dealer or your Firestone Store now for the best deal you ever got on the longest wearing, most dependable tire ever built for on- and off-the-road performance!

**WHEN YOU BUY NEW EQUIPMENT  
OR REPLACEMENT TIRES SPECIFY**

# Firestone

Test after test proves you get extra original tread miles and more retread miles at lower cost with Firestone Super Mileage Lug Tires.

**DEEPER  
TREADS  
LAST  
LONGER!**



Enjoy the Voice of Firestone on radio or television every Monday evening over ABC.

... for more details circle 202, page 16

**ROADS AND STREETS, October, 1956**

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## LOOKING FOR THE LOWEST-COST TRUCK?

Take a tip from  
the men who  
buy trucks  
every  
year!



# Big fleets buy more Fords



"Our 27 Fords average 5½ miles to the gallon," say cement haulers of Material Transportation Company, Harlington, Texas. "Oil economy is good, too. Our F-800 and F-900 BIG JOBS average 125,000 miles before we drop the pan. Fords are the most economical and satisfactory trucks we've ever used."

The big fleets keep complete cost records.  
They know which trucks cost less to buy and run.  
And official R. L. Polk registration figures  
**PROVE FORD IS THE FAVORITE!**

**Take a look at these pages.** These leading companies are just 4 out of thousands that are finding Ford trucks cost less to buy, less to run—and are "tops" for all-round economy.

The "men who buy trucks every year" must take everything into consideration . . . Short Stroke engine design for low oil and gas consumption . . . Ford's stronger chassis for longer life (insurance actuaries prove Ford Trucks last longer) . . . and Ford's higher resale value. So—from Pickups to 65,000-lb. GCW BIG JOBS, the big fleets are going Ford. You'll agree *Ford Trucks cost less*—after discussing your needs with your Ford Dealer.



"Our 300 Fords cost less to run," says Johnson, Drake and Piper Inc. of N. Y. City, world-wide contractor and owner of F-800 BIG JOBS. "We've tried all makes but

our records show that, when all factors are considered, *Ford Trucks cost less*. Low running costs. Low purchase price. High trade-in value."

# than any other make!



"Our 102 Fords last longer," says David L. Brown, Tennessee contractor and owner of Ford T-800 BIG JOBS. "In our kind of work, we need a truck that can take a real beating and keep on going. We have a Ford that's been running for 5½ years without a motor job—and it's still rarin' to go!"



"Our 30 Fords are easiest handling," says Elmer C. Breuer, Cleveland steel hauler. "Maneuvering our Ford F-900's in tight spots is timesaving and easy. And with that Power Steering our drivers finish fresh after a tough day's work. We're staying with Ford because they give us fast, dependable service."

## FORD TRUCKS COST LESS—LAST LONGER

Using latest license registration data on 10,502,351 trucks, life insurance experts prove Ford Trucks last Longer.

... for more details circle 280, page 16

ROADS AND STREETS, October, 1956

85

Allis-Chalmers  
LOW-COST  
Model **D**

**BIG**

in power  
in strength  
in versatility



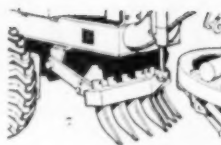
**THE MODEL D GRADER HAS THE POWER** to tackle bigger jobs. With either 50-hp gasoline engine or 50-hp diesel engine, there's extra torque and lugging ability for top performance on all projects.

**BIG-GRADER DESIGN** means long life for the Model D — regardless of the job. Strong, single-member main frame . . . husky drawbar and one-piece circle . . . work-boosting ROLL-AWAY moldboard . . . ground-gripping tandem drive . . . precision control . . . easy operation and simple servicing — all are plus performance advantages.

**JOB-MULTIPLYING ATTACHMENTS** make the Model D a *specialist* on many applications: —

ROLL-AWAY is an Allis-Chalmers trademark.

See the Model D at your  
Construction Machinery Dealer —  
headquarters for True Original Parts and Service.

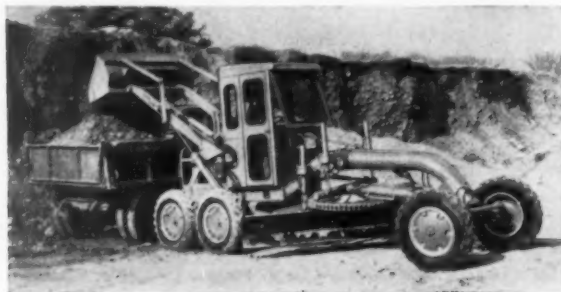


**HYDRAULIC SCARIFIER** — exclusive mid-ship mounting under D's heavy end for better steering, maximum traction and full penetration. With seven removable teeth, scarifier cuts a swath 27¾ in. wide.

**ALSO** output-boosting extras — rear-mounted ⅝-yd loader, shoulder maintainer, windrow eliminator, snow-plow blades. Plus optional equipment — including power circle turn, shiftable moldboard, leaning front wheels, all-weather cab, heater, etc.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION  
MILWAUKEE 1, WISCONSIN

**ALLIS-CHALMERS**





# GULF PRODUCTS and FINE SERVICE

keep equipment rolling  
on Arkansas Flood Control Project



Atlas Construction Company, Vidalia, Louisiana, has the contract for a 70-mile irrigation ditch for an important flood control project in Arkansas. Gulf lubricants and fuels help keep every unit of equipment running smoothly on a tough operating schedule of 24 hours a day, 7 days a week.

With higher-than-ever operating costs threatening your profits, it will pay you to take stock of the advantages Gulf offers as a supplier of petroleum products.

Advantages like these: Quality lubricants that provide an extra margin of protection against mechanical delays; fuels that insure top engine performance; prompt delivery service from close-at-hand distribution points; and helpful petroleum engineering counsel.

You will find, as have so many leading contractors—ask Atlas Construction Company, for example—that these advantages add up to smoother operation and lower maintenance costs.

Send the coupon for a copy of Gulf's new brochure, "Gulf and Your Business."

... for more details circle 214, page 16

ROADS AND STREETS, October, 1956

## Gulf Oil Corporation • Gulf Refining Company

1822 Gulf Building, Pittsburgh 30, Pa.

RS

Gentlemen:

Please send me a copy of your new brochure, "Gulf and Your Business."

Name .....

Company .....

Title .....

Address .....



# \$890,000 WASHO Test confirms...



6" Asphalt concrete  
2" to 18"  
base and sub-base



32 Kip<sup>†</sup> axle load



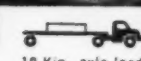
2" Asphalt concrete  
4" to 20"  
base and sub-base



40 Kip axle load



6" Asphalt concrete  
2" to 18"  
base and sub-base



18 Kip axle load



2" Asphalt concrete  
4" to 20"  
base and sub-base



22.4 Kip axle load

## Standard ASPHALT pavements carry the heaviest legal axle loads

### Q What was the WASHO Test?

**A** A dynamic test of Asphaltic concrete pavements made at Malad, Idaho. It entailed 119,003 test trips during a two-year period under all weather conditions.

### Q What does "WASHO" mean?

**A** Western Association of State Highway Officials.

### Q How was the test made?

**A** Loaded trailer-trucks were operated over 2 test loops. Each straight-away contained five 300-foot test sections. Over-all thicknesses were 6, 10, 14, 18, 22 inches. Pavement thicknesses were 2 and 4 inches. Foundation soil: A-4-B silt of moderate plasticity.\*

### Q What was the least structure to carry the 18-kip<sup>†</sup> load without distress?

**A** 2-inch Asphaltic concrete pavement over 14-inch sub-base.

### Q What was the least structure to carry the 40-kip load without distress?

**A** 4-inch Asphaltic concrete pavement over 14-inch sub-base.

### Q What did test reveal about Asphaltic concrete-paved shoulders?

**A** They permit reduction of over-all thickness by several inches. They lower maintenance costs. Increase safety through greater width.

### Q Can these findings be applied generally?

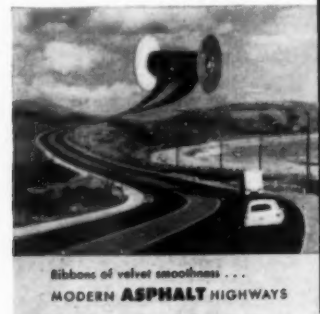
**A** Yes... with normal engineering modifications for climate, foundation soil, aggregate, etc.



### THE ASPHALT INSTITUTE

Asphalt Institute Building  
College Park, Maryland

\*Ref.: Highway Research Board Special Reports  
18, "The WASHO Road Test - Part 1: Design, Construction and Testing Procedures"  
22, "The WASHO Road Test - Part 2: Test Data, Analyses, and Findings"  
<sup>†</sup>Kip=1000 lbs.



... for more details circle 183, page 16

# All-wheel-drive traction PLUS!



## Digs More

A combination of powerful "pry-out" action using breakout pads as a fulcrum for leverage and a 40° bucket tip-back at ground level gets BIGGER LOADS with less spillage.

## Carries More

Heaped loads are cradled closer and lower for greater stability while carrying. Exclusive load shock-absorber also cushions the load, smooths the ride, and permits faster movement with less spillage.

## Delivers More

Since you get MORE to begin with and keep MORE while traveling at higher speeds . . . with less spillage in both instances . . . the result—you deliver more yards per load and more loads per hour.

One of the big reasons why the new all-wheel-drive "PAYLOADER" tractor-shovels can accomplish more *work* and can do more *jobs* is the BONUS tractive effort provided by their power-transfer differentials. This important feature—exclusive with "PAYLOADER" in the tractor-shovel industry—automatically transfers more power to the wheels on the firmest footing. You get traction and action instead of wheel-spinning inaction on sand, mud and snow.

These outstanding machines also have "no-stop" power-shift transmissions, torque-converters, planetary final drives, power-steering, 4-wheel power brakes. Your "PAYLOADER" Distributor is ready to show you *all* the superior features of these three new models. A demonstration will convince you that they are the finest, most productive units, size for size, in tractor-shovel history.



# PAYLOADER®

MANUFACTURED BY  
**THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.**  
SUBSIDIARY INTERNATIONAL HARVESTER COMPANY



**THE FRANK G. HOUGH CO.**  
768 Sunnyside Ave., Libertyville, Ill.

Send data on "PAYLOADER" Tractor-shovels

- ☐ 4 wheel drive types to 2 1/4 cu. yd.
- ☐ rear wheel drive types to 1 1/2 cu. yd.
- ☐ front wheel drive types to 1 cu. yd.

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



Macks are popular on the St. Lawrence Seaway... and for good reasons—their bonus capacities, sure-footed traction, and dependable power pay off. (Right) A Mack lineup ready for work on...



## The St. Lawrence Seaway... a big job for big trucks...

...a job for a lot of heavy-duty Macks—that's the conclusion of Miron & Freres, Limited, the contractor working on the Cote St. Catherine section of the St. Lawrence Seaway. They are using Mack off-highway dumpers exclusively, over 30 of them, for their big earth-moving job. And their big Macks are paying off for them in real hauling efficiency—plenty of power for big payloads with

minimum maintenance costs... even during winter operations.

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Driving piles near end of bridge, 23 miles from starting point. Single point pick up — permissible with prestressed pile — speeds setting and driving.

TEN YEARS AGO this month the first successful application of prestressed concrete in the U. S. was completed — the prestressed concrete portion of Roebling's Chicago Warehouse. Four years later the first prestressed concrete bridges in this country were completed — tensioned, of course, with Roebling materials. And during that interval we increased our knowledge through constant research plus the design and fabrication of prestressed concrete decks on several of our Central and South American suspension bridges.

As this new material has caught on with ever-increasing rapidity, engineers and fabricators have turned to us for information on materials and methods. This collaboration has not only helped them but has kept us constantly abreast of new developments and new requirements in tensioning elements.

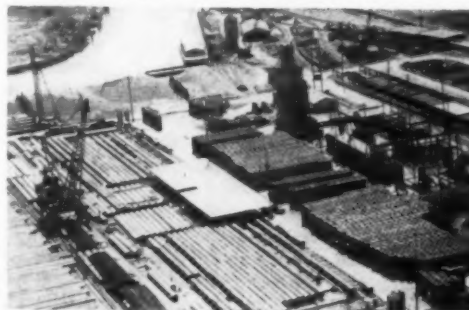
An example of Roebling's position as America's foremost supplier of tensioning materials is the Lake Pontchartrain Bridge, utilizing 123,000 miles of .192" diameter Roebling wire for prestressing the piles supporting this 24 mile long structure.

When you need tensioning materials or have a problem in prestressed concrete, why not turn to headquarters for suggestions and advice on specific applications? Contact Construction Materials Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

*Builders; Louisiana Bridge Co., Mandeville, La. (a joint venture of Brown & Root, Inc., Houston, Texas and T. L. James & Company, Inc., Ruston, La.). Designers, Palmer & Baker, Inc., Mobile, Alabama.*



Post-tensioning the cables. Piles are 54" outside diameter, 80 and 96 feet long, and stressed with 12 cables each containing 12 wires, .192" in diameter.



Louisiana Bridge Company casting yard where more than 900 feet of the Cen-Vi-Ro type piles were fabricated per day under special license agreement with Raymond Concrete Pile Company of New York.

# ROEBLING



Subsidiary of The Colorado Fuel and Iron Corporation



... for more details circle 251, page 16

ROADS AND STREETS, October, 1956

## EDITORIAL

### Contractor Costs Will be Higher

Several contractor associations have done their membership a service recently by again warning them of advances in equipment and material prices. We are already in the midst of a price rise. The high construction cost index for the second quarter of 1956 in California, for example, reveals a 16.6% increase over the first quarter and a 20% rise over the last quarter of 1955.

Advances in steel prices are of course one of the factors. A \$12.00 per ton increase in prices of steel announced by steel warehouses which distribute a substantial tonnage, was followed by general mill price increases following the strike.

Wage increases are being negotiated in such other basic industries as rubber and aluminum, giving a further clue of things to come.

And it takes only a little common sense thinking to realize that equipment costs will be higher generally. With the huge road building program and other booming construction, equipment manufacturers expect to remain in a seller's market. One contractor association estimates that prices of equipment will advance from 3% to 7% from the jump in steel prices alone.

Bid prices are so tight today in many quarters that there is little room for failure to anticipate cost rises.

When the city of Chicago advertised for trucks for daily hire the other day for construction work around the city, truck owners again entered a standard bid at a price set by their Union. An earlier truck hire list had been cancelled on order of Mayor Daley after charges of collusion in bidding but a grand jury refused to take any action.

Clearly in instances of this kind, the city would be justified in buying additional trucks of its own, since it

cannot enjoy the benefits of free competition in hiring trucks from private owners. It would be interesting to compare the bid price of \$31.81 per day with actual operating costs of city-owned trucks.

The mileage to be added to the Interstate System will not all be located in and around cities. There will also be some new cross-state connecting links, such as the one contemplated from Denver to Salt Lake City through Colorado. The Colorado segment will be of tremendous value to that state. Several other such new strands in the Interstate network will help strengthen our road system.

It is hoped however that the Interstate System will not be allowed to grow too much, from here on. The history of the state highway systems in some states has been one of gradually expanding the mileage so that funds earmarked for the system are spread too thin.

Designers planning highways which are not part of the Interstate system must be ready to raise their sights where traffic volumes justify. Many sections of primary and urban highways not on this system carry extremely heavy traffic concentrations.

One of the most important small details is that of bridge decks. Throughout the history of road building in the past 30 years, there has been an amazing lag in evolutionary thinking on the part of bridge designers with respect to deck width. In refreshing contrast, the committee which set up the new Interstate standards has decreed that decks for structures 150 ft. or less in length have sufficient width to allow for continuing

across the bridge with a 10 ft. shoulder on each side.

The new Indiana toll road, 80 miles of which was opened in August and the remainder due soon, has numerous substandard bridges which narrow down to inadequate shoulder width, requiring guard rails and other devices to catch the driver's eye. This was no doubt dictated by cost considerations in meeting bond financing limitations, but nevertheless is an example of less than the safest design.

A ray of sunshine in the toll road landscape is the steady climb of toll revenues on the New York State Thruway. Revenues jumped 76% during the first half of 1956 over the comparable period of 1955, according to Authority Chairman B. D. Tallamy.

This increase represents some new facilities which have opened their gates. But the 398 mile controlled section from Buffalo eastward enjoyed a jump of 53.7% in the period.

About those accusations of \$9 million graft by the former Pennsylvania Turnpike regime. The present administration in Pennsylvania (or Grand Jury) owes it to the nation to call in an outside auditing agency of highest reputation, and give it a free hand to investigate and report. Otherwise Mr. John Q. Public will not know how much of this is "politics," or who is crooked and who isn't. And what is to prevent the present regime from similar irregularities?

A \$50 billion question is involved here, for all state legislatures, good roads associations, civic groups and industry leaders to ponder as we roll up our sleeves for the world's greatest peacetime public works construction job.

**Integrity is the First Priority in Highway Administration**



● Along the Garden State Parkway — example of restaurant and gasoline station design, located between the dual roadways and reached by frontage road.

## Design Standards For Interstate Roads

*Road planners and designers know where they stand on Interstate project details as a result of a policy statement unanimously endorsed by AASHO leaders. But in the long-range, the projects first launched will be considered as laboratories. Design evolution will continue toward safer and more efficient facilities.*

**By Duane L. Cronk**

Washington Editor of ROADS AND STREETS

AT THE Chicago meeting sponsored this past summer by the American Association of State Highway Officials, design engineers took a long look into the future. Their objective: To determine how the superhighway for 1976 should be designed.

There was considerable debate over a proposed draft, submitted after months of committee work. The document was scrutinized in detail, but the final vote was unanimous. In a matter of a few hours, AASHO leaders from the 48 states stamped with approval the criteria under which they will design some 41,000 miles of superhighway and build into the American highway system the modern features heretofore visible on only a few parkways, freeways and toll roads.

In essence, the "Geometric Design Standards for the National System of Interstate and Defense Highways" is an attempt to build capacity and functional permanency into the network which will form the backbone of America's 3.3-million-mile road system. The engineers who drafted the document emphasized that they be considered minimum standards, to be used only where excessive costs

would prevent higher standards.

Major provisions are:

- *Control of access* shall be provided in original design for all projects, and rights must be acquired prior to construction. No intersections at grade will be permitted except in rare instances where all five of the following conditions prevail:

1. The Interstate highway is a two-lane road with a DHV\* 1975 of less than 500.

2. The proposed intersection is with a road on which the current traffic is less than 50 vehicles per day.

3. Such intersections do not exceed two per-side, per-mile.

4. Connections are designed which will minimize interference with the flow of traffic on the Interstate road.

5. The right to eliminate, terminate or re-route the access road is vested in the highway department at time of initial construction.

(Further protection to control of access is provided by the federal law authorizing the Interstate System which states that the Secretary of

\*Peak hour used as a basis for design: the 30th highest hourly volume of the year 1975 (DHV 1975).

Commerce must review, and may disapprove, any infringement upon the control of access feature of network.)

No railroad crossings at grade will be permitted.

- *Design speed* for highways on the system must be 70, 60, and 50 mph respectively for flat, rolling, and mountainous topography. In urban areas, the design speed is at least 50 mph. Gradients for these design speeds must not exceed 3%, 4% and 5%, respectively, except that in mountain areas, gradients 2% steeper may be provided. Curvature, super-elevation and sight distance for these design speeds are to be in accordance with the AASHO "Policy on Geometric Design of Rural Highways."

- *Traffic lanes* shall not be less than 12 ft. Where the DHV (1975) exceeds 700, or exceeds a lower two-lane design capacity applicable for the conditions on a particular section, the highway must be a divided highway. For lower volumes, the highway will have two lanes so designed and located on the right-of-way that an additional two-lane pavement can be added in the future to form a divided highway.

Efficiency and capacity of two-lane highways may be increased by providing added climbing lanes on up-grades where critical lengths of grade are exceeded, or by providing more frequent and longer sections safe for passing.

- *Medians* must be at least 36 ft. wide, except in urban or mountainous



● Example of four lane divided highway closely approaching the standards now required for the Interstate — U.S. 66, Missouri.

areas, where 16-ft. strips will be permitted. Narrower medians may be provided, also, in urban areas of high right-of-way cost, on long and costly bridges, and in rugged mountains. But no median will be permitted less than 4 ft. wide.

Where continuous barrier curbs are used on narrow medians, they must be offset at least 1 ft. from edge of through traffic lane. If vertical elements more than 12 in. high are located in a median, there will be a lateral clearance of at least 3½ ft. from edge of traffic lane to face of such element.

● *Shoulders* usable by all kinds of vehicles in all weather are to be provided, at least 10 ft. wide, except in mountainous terrain where the usable width may be reduced to 6 ft.

● *Side slopes* are to be 4:1 or flatter where feasible and not steeper than 2:1 except in rock excavation or special conditions.

● *Minimum right-of-way widths* are not given because conditions may prevent the most desirable and right-of-way need not be of constant width. The following minimums shall be used as guides. In rural areas:

Highway Type	Without Frontage Roads	With Frontage Roads
2-lane .....	150 ft.	250 ft.
4-lane divided ....	150 ft.	250 ft.
6-lane divided ....	175 ft.	275 ft.
8-lane divided ....	200 ft.	300 ft.

In urban areas, right-of-way width will be not less than that required for the necessary cross section elements, including median, pavements, shoulders, outer separations, ramps, frontage roads, slopes, walls, border areas, and other requisite appurtenances.

● *Bridges and other structures*, preferably of deck construction, are to be located to fit the over-all alignment and profile of the highway. The clear height is to be at least 14 ft. over the entire roadway width, including shoulders. The width of all bridges more than 150 ft. between abutments or end piers be the same as the roadway width of the approaches, including shoulders.

Barrier curbs on bridges longer than 150 ft. are to be offset at least 2 ft. Offsets to face of parapet or rail shall be at least 3½ ft. from edge of traffic lane. The lateral clearance from the edge of the traffic lane to the face of walls or abutments and piers at underpasses will be the usable shoulder width, but not less than 8 ft. on the right and 4½ ft. on the left.

A safety wall is to be provided in tunnels and on long-span structures where the full approach roadway including shoulders is not continued.

Approval of the standards by the Bureau of Public Roads a few days after the Chicago Conference was routine. The BPR had followed the work of the AASHO committee closely and participated in the drafting.

As is apparent, the geometric standards for the National System of Interstate and Defense Highways are not complex, nor inflexible. The wording of some provisions is general enough to permit various interpretations.

As one highway engineer put it:

"They are strict enough to protect us from political pressure, particularly in the matters of location and control of access. We can lean on the bureau and the bureau can lean on the standards.

"At the same time, the standards will permit exception and interpretation based on practicability as well as consistency."

● *Stage Construction*. The most important change in the standards to come out of the Chicago meeting was the decision to require only that provision be made in the original design of an Interstate highway for stage construction to capacity for 1975 traffic, rather than to require that *original construction* be to that capacity. For example, the state highway department must acquire sufficient right-of-way initially for the additional lanes to be built in later years. Likewise, structures carrying the Interstate route must be constructed wide enough to accommodate additional lanes upon them and structures crossing the Interstate project long enough to allow additional lanes beneath them.

The final draft of the standards represents, presumably, the best thinking of highway designers about, not only the behavior of traffic as it is known today, but the nature and the needs of traffic 20 years from now. This is a big bite. Who could have predicted 20 years ago what the nature and demands of automotive traffic would be in 1956? The record indicates that no one came even remotely close to forecasting the extent of our current highway needs.

The AASHO committeemen are the first to admit the limitation of their knowledge about highway travel and transportation in 1976.

It will take years of use to bring out the weaknesses in the Interstate design standards. Except for isolated studies of traffic behavior on the few miles of superhighway now existent, there is no library of knowledge on how motorists will react to transcontinental travel, or, for instance, what the engineer can do to break up the hypnotic effect of "effortless" driving.

The toll roads have taught designers much and it may be hoped that the first stretches of the Interstate System, already under construction, will become experimental laboratories. The just-approved standards must not freeze design thinking. Those who have been most closely associated with the development of the standards are agreed that their best will not be good enough for 1976.

Nevertheless, however uncertain may be the needs of the future, the Interstate standards embody the highest type of engineering principles. They represent a unique balance of what is known about traffic needs and what can be anticipated. They are probably as specific as uniformity demands and as flexible as political practicality requires. If application of the standards is as bold as their philosophy, the result cannot help but be the type of highway system that will bring new vitality to America's automotive age.

### Problems Facing Interstate Job Planners

The immediate problems likely to face engineers planning Interstate projects were reviewed recently for *Roads and Streets* by Joseph Barnett, assistant deputy commissioner of the Bureau of Public Roads.

(Continued on page 99)

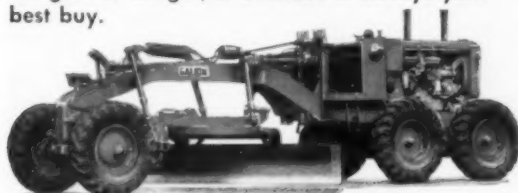


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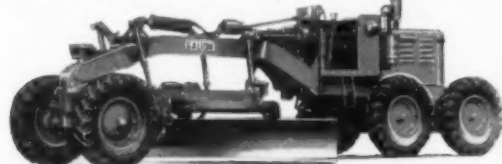
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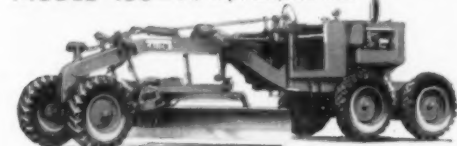
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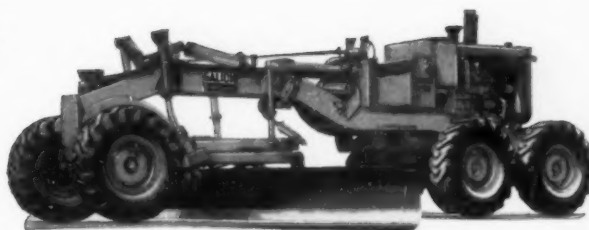
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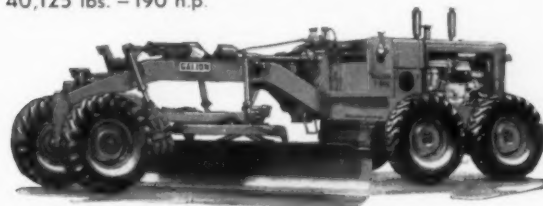
MODEL 303 - 55 h.p. 14,445 lbs.



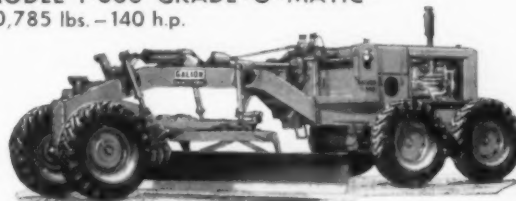
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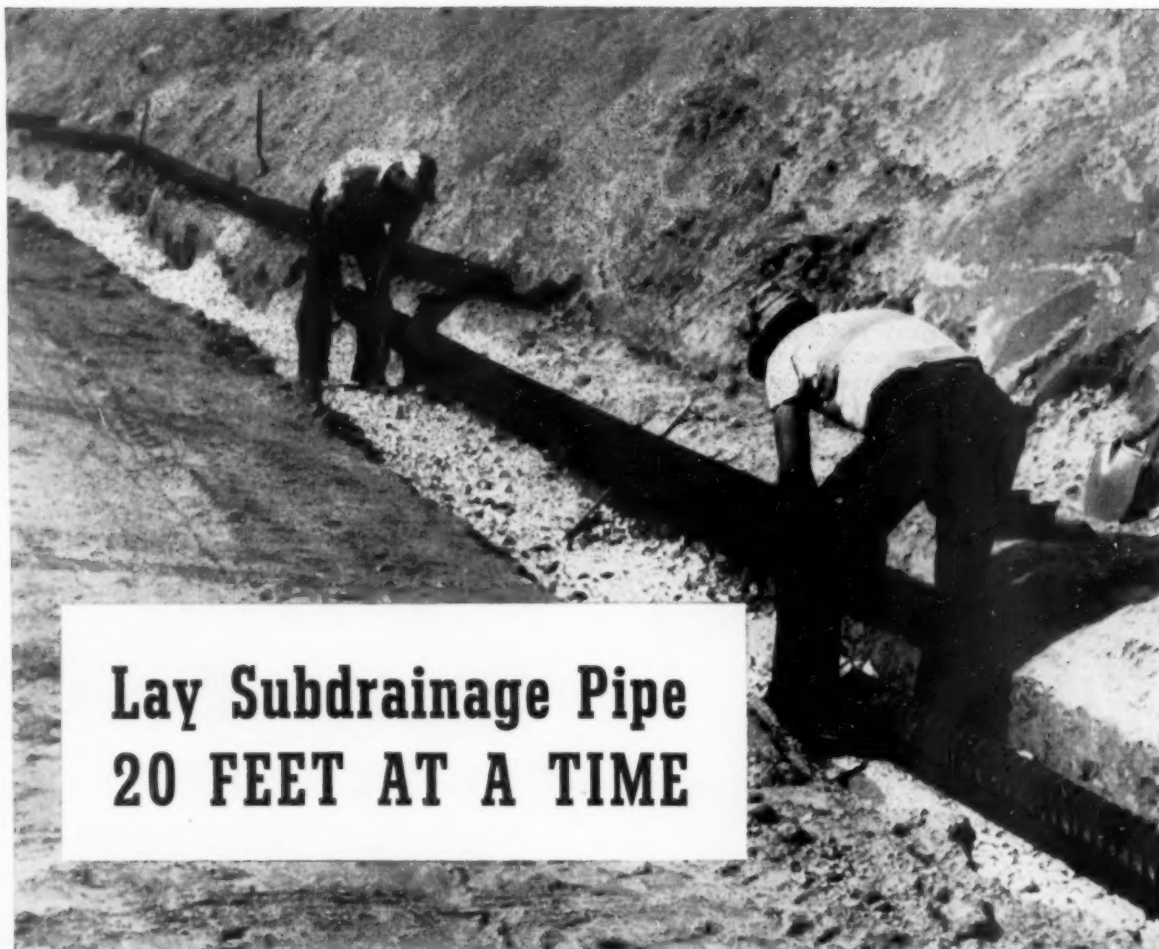
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... for more details circle 207, page 16

ROADS AND STREETS, October, 1956



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... for more details circle 180, page 16

**ROADS AND STREETS, October, 1956**

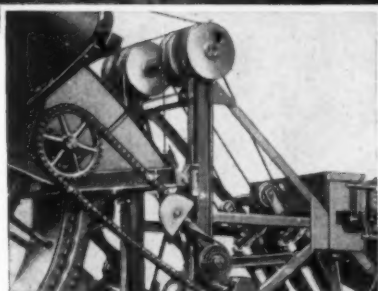
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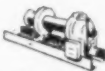
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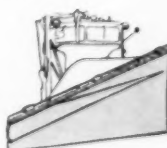
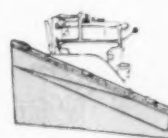
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... for more details circle 205, page 16



## Design Standards

(Continued from page 94)

He listed "control of access" as the feature most likely to draw criticism. But, he added, it is this very element that has made toll roads so popular.

"Surely, there are always a few businessmen along the old route who are hurt when a new highway is built to divert traffic around a congested commercial area. But the main business community benefits tremendously. Traffic congestion is relieved and local customers begin again to patronize the downtown business. 'They lose traffic, but they gain business.'"

Mr. Barnett also pointed out there are plenty of cases to prove that expressways, or "gasoline alleys" as they are labeled, do not retard development of adjacent land or deflate land values. To the contrary, he said, "There is sufficient evidence that land along controlled-access highways develops faster than land elsewhere."

The type of business that will probably locate near access points on the Interstate System will be large warehouses or light manufacturing firms which depend on truck transportation. To such enterprises, the new, high-speed roads will serve almost as ex-

tensions of factory assembly lines.

Mr. Barnett noted that final location of proposed Interstate routes will be another immediate problem. Various state highway departments have already received approval of more than 10,000 miles.

"Location is not a simple operation," he recently told listeners of the Purdue Road School. "There should be reconnaissance of the various alternate routes to determine which will be the most economical to construct, detailed comparison of cost and sometimes complete economic analysis."

"It is in the suburban and urban areas that location becomes an extremely difficult problem, and it is not unusual for many alternate lines to be considered and studied in great detail. It is extremely difficult to find a location through an urban locality that is continuous and free of untouchable areas; such as, tall and costly buildings, cemeteries, public buildings, churches, and schools; and not disrupt the neighborhood's economy in considerable degree. Shifting short sections result in differences in cost running to the millions per mile."

He cited the example of one city that has studied no less than 17 alternate routes in an attempt to find

the cheapest.

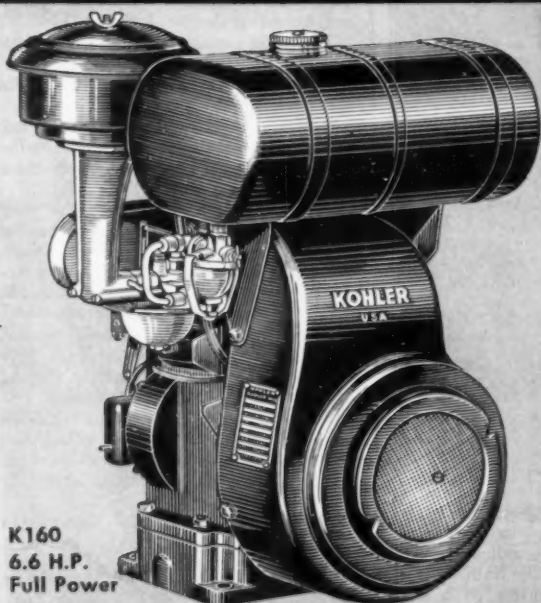
Some states will be faced with the tough decision of whether to buy additional right-of-way along existing roads and bring them up to Interstate standards or launch out on new line.

The BPR official cautioned that Interstate project designers, although using standardization to advantage, must be creative as well.

"I am fearful that the pressure for standardization and speed may produce highways which, while their individual design features are of high order, may prove monotonous to drivers. Induced carelessness from driving long tangents is not an imaginable phenomena. It is one of the very real, and undesirable, products of the efficient controlled-access highway which is designed as standard."

"The Interstate System highways should excite the imagination. We can't obtain that reaction by standardization and later trimming up a few bushes and trees."

"It will come only if designers of each section consciously set out to obtain a pleasing appearance as well as to meet the demands of traffic. It will not require more money and need not take more time. It will take imagination."



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One technique which will permit flexible design, Mr. Barnett said, is to consider each roadway as an entity in itself, as far as right-of-way width and topography will permit.

"Cars are not driven in two directions at one time, and a divided highway is always superior when the designer thinks and works in terms of one-way roads rather than one center-line for a fixed cross section. The design of intersections and interchanges is not included in this discussion but it is well to advise that designing separate one-way roadways is parti-

cularly fruitful in intersection design.

"A good example is US 240 south of Frederick, Maryland, a divided highway designed for the Maryland state roads commission by Wilson T. Ballard, consulting engineer of Baltimore. Here advantage was taken of rolling topography to develop two separate one-way roadways which resulted in grading of about 60,000 cubic yards per mile. Studies showed that an alternate with a standard cross section would have required grading of about 280,000 cubic yards per mile.

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Photo by Jerry Pratt, Constructioneer

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moval of solid rock. The pump stands about 20 feet above water level and is discharging over the rise, as shown in the upper right of the picture. The 500-ft. spillway chute handles overflow from the 2½-sq.-mile dam.

Keep your job moving with a Gorman-Rupp Contractors' Pump. It is guaranteed in plain language.



### THE GORMAN-RUPP COMPANY

305 Bowman Street

Mansfield, Ohio

... for more details circle 212, page 16

## New Equipment

### Rock Bits

A new line of taper-socket Brunner & Lay Rok-Bits has been announced by Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. These taper-socket Rok-Bits are available in the following gauge sizes: — for ¾-in. drill steel, 1¼-in.; 1½-in.; 1½-in. No. 7 Class A Taper and for 1-in. drill steel, 1½-in.; 1½-in. — No. 8 Class B Taper. Bronze shims supplied with each bit. There are no threads to strip; no body distortion from lock-on, it is said, and bit is easily removed from drill rod.



Brunner & Lay Taper-Socket Bit

For more information circle 107 on Service Coupon Page 16 and mail now.

### Tractor-Mounted Ripper

A new tractor-mounted ripper designed specifically for use with the Caterpillar D9 tractor has been announced by Caterpillar Tractor Co., Peoria, Ill. It will be called the No. 9 ripper.

Increased maneuverability, better control of ripping depth, and extreme utility are the important features claimed for the new ripper.

The complete ripper consists of two mounting brackets, two hydraulic cylinders, one beam assembly, and three teeth. It weighs 10,830 lb.

The No. 9 ripper mounts on the bevel gear case through a special drawbar bracket group which replaces the standard drawbar brackets. The ripper is operated hydraulically by two hydraulic cylinders working in conjunction with the Caterpillar No. 50 hydraulic control. The convenient hydraulic controls give the operator good control of the ripping depth which can go down to 28 in.

The box-section beam, 12 in. x 12½ in. x 10 ft. 7½ in., is made of alloy steel plates, submerged arc welded for high quality welds, and reinforced inside by additional plates.

The shanks are made of heat-treated



No. 9 Ripper

steel to withstand the rugged terrain. Each shank has a hardened alloy cast steel boot which has a replaceable, hardened cast steel point. The teeth are swivel mounted to "roll with the punches." When rocks or other obstructions are encountered, the teeth will swivel up to 10 degrees to minimize the rugged side thrusts.

The No. 9 ripper is driven from a "live drive" hydraulic pump which permits the ripper to be raised and lowered independently of the flywheel clutch or torque converter. A convenient control feature is the automatic kickout which throws the hydraulic control lever back to "hold" position at the end of the "raise" stroke.

Down pressure available to the ripper is equal to the weight of the rear of the tractor. If the operator desires, he can easily reach and maintain the maximum ripping depth.

For more information circle 108 on Service Coupon Page 16 and mail now.

### Wider Blades for Concrete Sawing

Two new, wider specifications in the Reinforced Break-Resistant Abrasive Green-Con blades for sawing "green" concrete have been announced by The Clipper Manufacturing Co., 2800 Warwick, Suite 749, Kansas City, Mo.

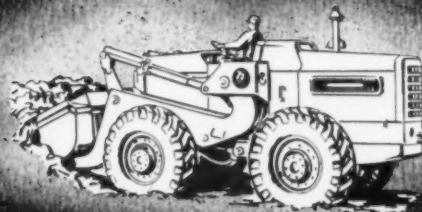
These new blades are designed primarily for use in sawing control joints where corrugated cardboard strips are used to control random cracking in highway and airport construction. The Green-Con specification C-5419 will produce a saw cut approximately  $\frac{3}{4}$  in. wide and the C-5424 will make a cut about  $\frac{1}{8}$  in. wide.

Clipper developed these wider specifications for use on control joint applications where difficulty was experienced in



New Clipper Green-Con Blade

## POWER BY HERCULES...!



"PAYLOADER" Tractor Shovels rely on . . . power by Hercules. These popular tractor-shovels require lightweight, high-speed, heavy-duty engines. That's why Hercules Gasoline and Diesel Engines were selected for many of the "PAYLOADER" models.

Hercules on-the-job engines are tailored to the specific power needs of all types of equipment in the following industries: transportation, agriculture, construction, mining, industrial, logging, oil field and marine.

For "top-notch" performance, insist on . . . power by Hercules in your equipment.

**HERCULES MOTORS CORP. • CANTON, OHIO**

. . . for more details circle 218, page 16



# UNIT on the Job

**UNIT 1020 offers every requirement for dragline operation—low ground pressure — stability — rotating fairlead — fast digging — rapid swinging — quick dumping.**



Perfectly balanced for long boom operation, the UNIT 1020 is ideal for general excavation work, sand and gravel pits, irrigation, drainage and stripping operations. Available with UNIT TORQUE DRIVE, this machine gives you smooth performance, eliminates "shock loads", cuts fuel expense. Write for literature.

**DIGS** *Deeper*  
**SWINGS** *Easier*  
**LOADS** *Faster*

**UNIT CRANE & SHOVEL CORPORATION**  
6407 WEST BURNHAM STREET • MILWAUKEE 14, WISCONSIN, U. S. A.



**1/2 or 3/4 YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY  
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL**



**All Models Convertible to ALL Attachments!**

... for more details circle 266, page 16

inserting the cardboard strips in a true, straight line. The wider blade is able to saw out the full width and correct for any curvature which may be present in the cardboard joint.

Clipper's wider Green-Con specifications may be used wet or dry at the contractor's option. For best footages, it is recommended they be used wet.

For more information circle 109 on Service Coupon Page 16 and mail now.

## Tapered Socket Carbide Insert Bits

A new line of rock bits, announced by The Timken Roller Bearing Co., Canton, O., are of the tapered socket carbide insert type and come in answer to the increasing use of light air-leg drills.

The new Timken tapered socket carbide insert rock bits are claimed to offer several distinct advantages: 1) They can be removed from the drill steel and discarded without throwing away the drill steel; 2) 4-point cross bits give longer life and greater footages between sharpenings; and 3) the tapered pin is easily fabricated on the drill steel.

New features in design and manufacture of the Timken tapered socket bits are stated to promise to contribute to longer drill life, higher drilling speeds and lower costs per foot-of-hole with new light weight drilling equipment.

New carbides in the cutting edges resist wear. Jet action from the new-five front hole design and the deeper wider clearance between bit wings make for faster chip removal, improving bit action and increasing bit life.



**New Timken Tapered Socket Carbide Insert Bits**

For more information circle 110 on Service Coupon Page 16 and mail now.

*More Items page 118*



# Bituminous

## ROADS AND STREETS

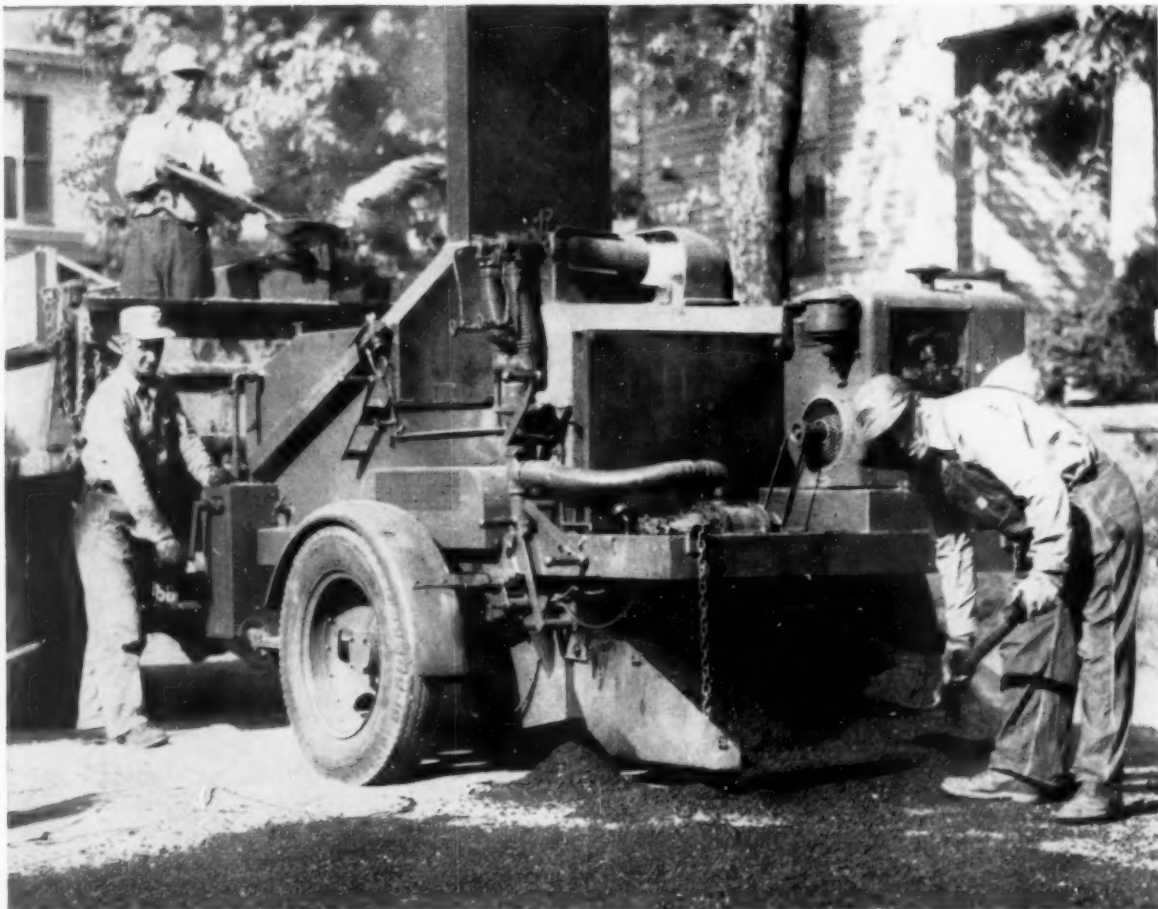


Spotting a carload of stone over a portable conveyor by means of a Huber-Warco Maintainer. Part of asphalt paving operations of Swift Paving Company near Blue Ridge, Georgia. This firm used a new Huber-Warco 8-12 ton tandem roller on the penetration macadam base and surface treatment involved.

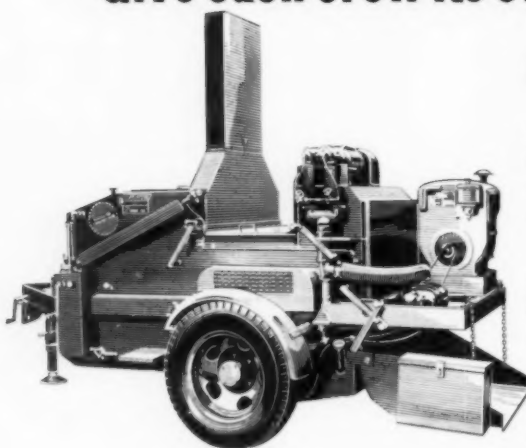
Published by Gillette Publishing Company,  
22 West Maple Street, Chicago 10, Illinois

**Fine Aggregate Recovery and Dust Collection**

OCTOBER 1956



## Give each crew its own asphalt plant and save \$1.82 on every ton!



The Littleford Trail-O-Patcher is a complete, self-contained portable asphalt plant. It's so convenient and economical, you can afford to provide each of your crews with its own bituminous mixer.

In fact, when you consider the \$1.82\* per ton saving, you can't afford not to keep several Trail-O-Patchers on the job continuously. You can mix as much as you want, anywhere and at any time of the year.

To appreciate the full significance of the increased convenience, efficiency and economy the Littleford Trail-O-Patcher now makes possible in bituminous mixing, send today for your free copy of bulletin 28.

\*\$7.00 From asphalt plant  
5.18 Trail-O-Patcher mix  
\$1.82 savings per ton



# LITTLEFORD

**Tops in Black Top!**

LITTLEFORD BROS., INC. 454 E. Pearl St., Cincinnati 2, Ohio

... for more details circle 237, page 16

# What's the real story on rubber alloys in asphalt hot mixes?

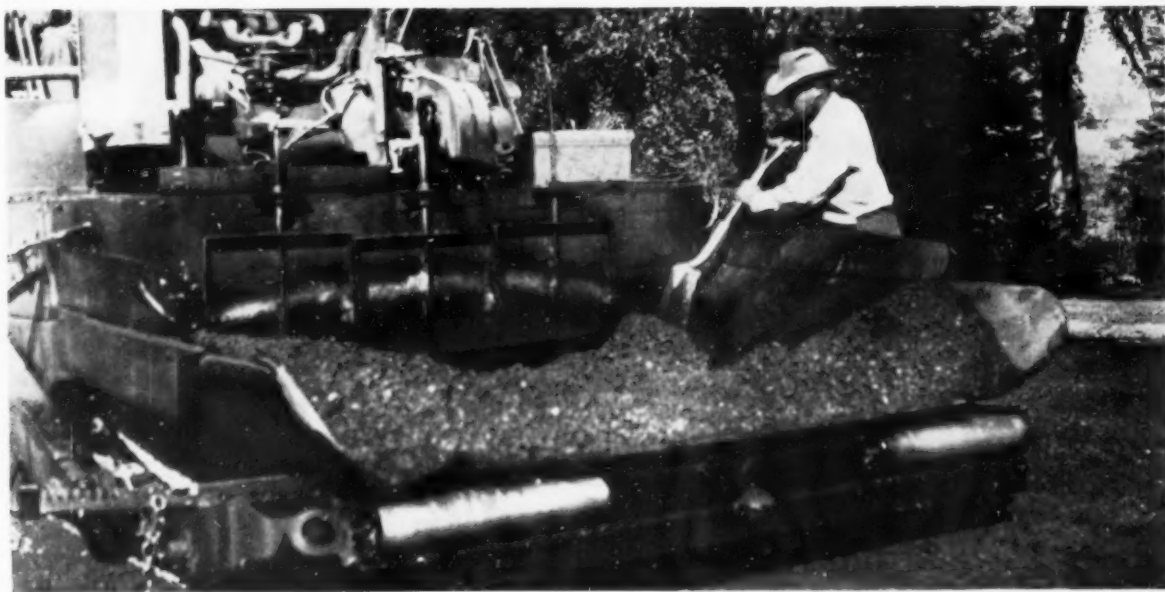
The real story on alloying asphalt with rubber for use in hot mixes, as we see it, is this:

1. Asphalt is a good road building material. But just as metals are alloyed to meet certain of today's needs, so can asphalt be improved with rubber.
2. Experiments with rubber for roads stretch back over three decades. Through the years much data have been accumulated. With these data and certain laboratory tests, we can prove that asphalt is definitely improved by rubberizing.
3. Although no rubberized road has been down long enough to prove our case conclusively, we can cite a number of installations where some improvements have been fully verified and better over-all durability is strongly indicated.
4. Recent years have seen the development of improved rubberizers, foremost of which is RUBARITE. RUBARITE is a

powder of synthetic rubber combined with particles of a special carrier. It was developed after years of experimentation and proved in hundreds of laboratory and road tests to be more effective than other types and forms of rubber in improving asphalt.

5. Today, there are some 1,100 miles of rubberized roads in use. These are the result of improvements such as RUBARITE and the fact that tests to date have been successful enough to convince a number of progressive engineers and contractors that, at the minimum, rubberizing will fully justify its added cost.

Well, that's the story. We feel it's strong enough, at least, to warrant further investigation of RUBARITE. If you agree, feel free to write for the booklet, "Bitumen Rubberizers," plus other details and samples. Address: Rubarite, Incorporated, 1702 Philtower Building, Tulsa, Oklahoma.



# RUBARITE INC

Rubarite—T. M. Rubarite, Incorporated, Tulsa, Oklahoma

Jointly Owned by The Goodyear Tire & Rubber Company, The National Lead Company and Bird and Son

... for more details circle 254, page 16



## Cutting costs is the primary function of portable conveyors

To make the greatest cost savings, portable conveyors must:

... have quality construction for long life and trouble-free operation. They must be available in the length and capacity range to suit your needs. They must be available with the features and accessories you want—screens, power hoists, pneumatic or steel wheels, gas or electric drives, etc.

They must be easy to move around the yard ...

easily towed from job to job. They must withstand constant use and frequent movement.

Shown above is the portable conveyor of advanced design, the Barber-Greene 363. Shaft and gear reducer drive—no chains—no sprockets, full swiveling wheels, Acme take-ups and many other exclusive features.

Shown below are other models in Barber-Greene's complete line of cost-cutting conveyors.



**Model 374 cuts cost at high capacity.** With capacities up to 425 t.p.h., this heavy-duty machine has antifriction bearings, shaft and gearbox drive, hydraulic boom hoist and other features.



**Model 358 cuts cost of car unloading.** Feeding a conveyor, this car unloader releases cranes and other expensive equipment for other work. Handles gravel, sand, stone, cinders, etc.



**Model 362—low-cost, high-quality portable.** Three-roll carriers, swivel wheel truck, and many other features not available on conveyors of this low-price range, are standard on the 362.

56-B-PO



# Barber-Greene

AURORA, ILLINOIS, U.S.A.



CONVEYORS...LOADERS...DITCHERS...ASPHALT PAVING EQUIPMENT

... for more details circle 184, page 16



# Experience with Asphalt Quality

## Control Tests in Michigan

*Published herewith is a letter of comment by Ward K. Parr  
on H. G. Nevitt's article, "The Specification Problem"*

### *To the Editor:*

We have noted with particular interest Mr. Nevitt's editorial entitled, "The Specification Problem," since direct reference is made to the Michigan State Highway Department Specifications for bituminous surfacing.

As Mr. Nevitt has stated, this specification is one of a performance type, in that, rather than controlling to an exact degree the materials and processing, the qualities of the end product are measured, since those are the qualities which we feel are the most important to the life of the pavement. From the consumers standpoint, those qualities represent the value he is receiving for his highway tax dollar. The highway engineer would not be fulfilling his responsibility as a public employee, if he did not recognize the value of specifications of this type to assure the highest quality end product. It is particularly important in the accelerated highway program that the highway users benefit not be deprived of this high quality due to the increased volume of construction.

A further look is required to fully understand how this specification is applied to Michigan construction. It is known as the Abson Recovery test, as it is based on a method developed and reported by Mr. Gene Abson, of the Chicago Testing Laboratory, in the 1933 Proceedings of the A.S.T.M. This method provides for the solution of asphalt in a relatively inert solvent (C. P. Benzol) and the subsequent recovery of the asphalt from the benzol solution by a two stage distillation process with essentially its original properties with respect to penetration (consistency) and ductility. This constitutes the tool by which the engineer can measure the changes of penetration and ductility of asphalts incorporated in various types of mixtures subjected to different types and periods of exposure or weathering.

The hardening and loss in ductility of asphalts during mixing with

aggregates are dependent on two conditions; namely, the ability of the asphalt to resist hardening due to oxidation and loss in volatile matter and the time and temperature conditions to which the asphalt is subjected during the mixing process. It must be acknowledged that asphalts do vary in their qualities in this respect, and also that poor construction techniques (overheating) can damage even asphalts of good quality.

### **Abson Recovery Test**

We have in the Abson Recovery test the tool by which the properties of the asphalt in the completed mixture can be measured and compared with those of the original asphalt. This, coupled with the only other quality type test applicable to asphalts; namely, the Oliensis Spot Test, which Mr. Oliensis so ably defended in this same publication, is the cornerstone on which the quality of Michigan's asphaltic concrete has rested for the past 20 years.

There is an abundance of evidence in the published literature which indicates that the penetration and ductility of asphalt in pavements are directly related to the durability of such pavements with respect to cracking, raveling, and resistance to abrasive forces of traffic; low values of these characteristics coinciding with lack of durability when the pavement is properly designed in other respects. It is, therefore, essential that as much of the ductility and penetration of the original asphalt be preserved as possible during its combination with the aggregates in the hot mix process. Loss of such properties may be caused by either loss of volatile material in the asphalt or by some thermo-chemical reaction; such as, oxidation, polymerization, or decomposition, such as "cracking," in contact with the hot aggregates. Any of these factors which influence rate of hardening are dependent on both the mixing temperature and the in-

herent ability of the asphalt to resist change in physical properties. With modern steam and vacuum distillation, generally, asphalts have minimum volatile losses. Temperatures must be controlled, however, at the asphalt mixing plant and, in these days, when high productive capacity is the keynote of such operations, temperature control may be neglected to the detriment of the asphalt.

To this end Michigan Specifications require a recording pyrometer in the hot aggregate bins, which gives a permanent continuous record of the aggregate temperature. Any aggregate which is overheated is rejected. Good correlation can be obtained between this record and the actual mix temperatures. This record offers, therefore, in the event of excessive loss of penetration and ductility, evidence such as poor construction practices in the form of temperature control.

Asphalts which are inherently low

*Editor's Note:* We have received further comment on Mr. Oliensis' defense of the Spot Test from several readers. Space limitations preclude publishing them all. One of particular interest we might comment on briefly is from E. J. Barth, of Northampton, Mass. His letter covers in more detail two points made by Mr. Nevitt — that the "unstable internal equilibrium" mentioned by Mr. Oliensis is a function of the solvent as well as the asphalt and would have real practical significance only if it were based on the behavior of the asphalt in contact with, or present as a film on, mineral aggregates or fibers rather than its condition after a certain kind of naphtha is added. Mr. Barth states: "We are concerned with knowing the film stability of the bitumen on the road, and in an 'as is' condition."

in resistance to hardening will show excessive decreases in penetration and ductility irrespective of mixing temperature, although such losses will be further accentuated with high temperatures. These losses may be caused, as stated before, by loss of volatile matter, or by thermo-chemical reaction, or decomposition. On the basis of present knowledge, the preservation of penetration and ductility of the asphalt binder is of prime importance in providing a paving mixture with life, toughness, and flexibility, rather than one which has dry, brittle, "dead," or "burnt" properties. Thus, the recovery test is a logical step towards a quality end product.

Under this specification, it may be interesting to note that the penalties under the specification have only been required in four or five projects in a twenty year period, during which over 4000 miles of hot mix bituminous surfacing has been constructed. In two of these cases, it was definitely established from the pyrometer charts that poor construction practice with respect to mix temperature control was responsible for excessive hardening of the bitumen. In the other cases, the asphalt itself was determined to lack inherent resistance to such changes. While the recovery test as constituted was never intended to predict weathering durability of the asphalts, it is of considerable assurance to the engineer to know that pavement surveys and sampling after construction indicate that the asphalts in pavements built under these specifications have retained a high percentage of their original properties. A survey completed last winter on a test section constructed 19 years ago shows 60/70 asphalts from several varied sources still retaining approximately 50 per cent of their original penetration and 150+cm. ductility values.

While it is acknowledged that the recovery test cannot be made except on the completed mixture and that thereon is a weakness of the test as far as predicting success or failure prior to construction, it must be also acknowledged that there exists today no such a quality test for asphalts prior to their use, which the consumer can use with assurance. This, coupled with the control the test gives over the construction operations, and the logical fact that the consumer is specifying properties he desires in the end product, points to the value of the Recovery test in obtaining quality asphalt pavements as Mr. Nevitt points out "as compared to the present general lack of any requirements on hardening."

Besides the satisfactory experience with this test in Michigan, it has been gratifying to note its use and study by other states and agencies. Only recently it has appeared as a part of a Bureau of Public Roads Specification for bituminous pavement construction under their control. This test may provide the impetus to further developments in end product quality

control and certainly, from the consumer's standpoint, represents a logical end product specification to assist the engineer in obtaining quality asphalt pavements.

Ward K. Parr  
Ann Arbor, Michigan  
Bituminous Consultant  
Michigan State  
Highway Department

## Mr. Nevitt's Reply to the Foregoing Discussion

### TO THE EDITOR:

We appreciate Prof. Parr's comments on our remarks in "The Specification Problem" (July R&S, by H. G. Nevitt) and can heartily subscribe to much that he says. He makes some pertinent points on the matter of specifications in general and asphalt hardening in particular that might well be heeded by many organizations.

We basically disagree with very few of his statements, although our interpretation of his facts might differ in a few cases. Our conflict is that in our opinion his facts, and consequently his deductions from them, do not tell the whole story. The present Michigan requirement was cited — and deliberately for the reasons given later — precisely because it seems so sound and yet may result in a questionable situation.

### Careful Considerations

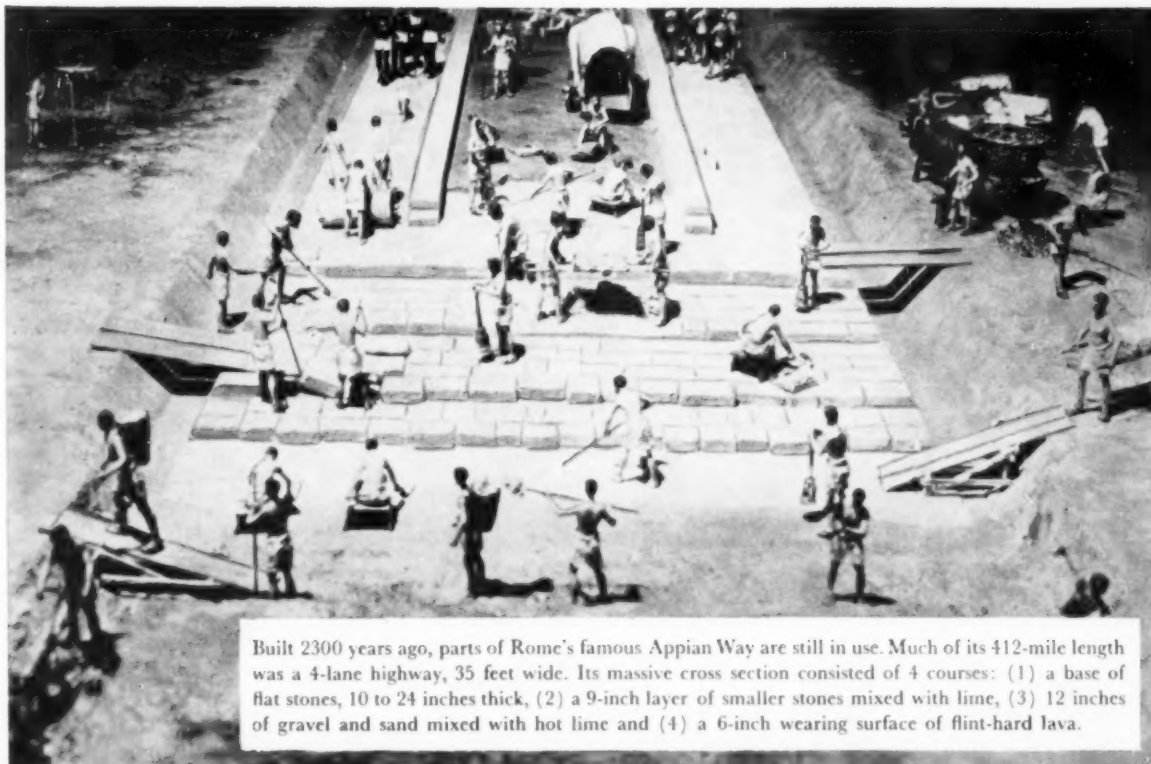
Careful consideration will show that this requirement is based not merely on the facts presented by Prof. Parr but in addition on three implied assumptions. One is minor. It is that the mixing temperature (set at the discretion of the project engineer) is correctly selected; if not, the asphalt though satisfactory may not meet the test. The other two are basic. The first is that to get a suitable binder (from the standpoint of hardness, and perhaps other tests) the initial characteristics, and therefore their change, must be specified. The second is that, to avoid undue hardening in the road during use, limited hardening in the construction process must be an asphalt characteristic. Neither of these implications is actually necessary. The asphalt consistency can be specified after construction, based on a technique which provides for the test of a sample of the material as it will result from the controlled construction procedure. And, while asphalts which

harden rapidly during normal mixing can likewise continue to do so after laying, there is no evidence for, and much against, any correlation necessarily existing between the two types of hardening. In brief, the Michigan specification eliminates certain undesirable asphalts; but in doing so it also rules out asphalts giving a suitable constructed mat which would weather satisfactorily, and accepts asphalts which show good resistance to high temperatures hardening but weather poorly or lack cohesiveness or other desired properties. Yet our knowledge today makes possible specifications that control the initial consistency in the completed mat and predict the further hardening tendencies with far more accuracy than the specification currently in use.

We wish to again emphasize our concurrence with a number of Prof. Parr's statements — although we do not see that they necessarily bear on the above fundamental point which formed the basis for our comment on the Michigan specifications. We like end-product specifications. Hardening (in the road, of a binder which is of the correct consistency after construction) must be avoided. The recovery tests help in watching this — though, while the recovered sample may have the same consistency, we have grave doubts that it chemically duplicates the binder in the road. We mainly disagree on the merits of the Oliensis spot test, thoroughly discussed in previous issues. We cannot forget that the only asphalt we happen to have seen which gave a non-homogenous film on aggregate had a negative spot and met the Michigan recovery test. Despite this we are sure that Michigan has had a good record with asphalts conforming to this specification. No asphalts have been used which meet it yet oxidize readily in the road;

(Continued on page 111)

## Naugatuck SURFA-SEALZ



Built 2300 years ago, parts of Rome's famous Appian Way are still in use. Much of its 412-mile length was a 4-lane highway, 35 feet wide. Its massive cross section consisted of 4 courses: (1) a base of flat stones, 10 to 24 inches thick, (2) a 9-inch layer of smaller stones mixed with lime, (3) 12 inches of gravel and sand mixed with hot lime and (4) a 6-inch wearing surface of flint-hard lava.

Photo courtesy Bureau of Public Roads, Dept. of Commerce

**today  
there's  
a better  
way!**

IMAGINE THE COST of building highways like this today! Yet, for more than 2000 years, the construction methods of the Roman Empire's roadbuilders were the accepted standard. Only in the past century-and-a-half has there been a significant change. Modern methods, pioneered in England by John McAdam, discard the massive stone base and stress a relatively thin paved surface laid over a raised and compacted earthen subsurface.

Today, forward-looking roadbuilders are availing themselves of a more recent development which promises to further reduce the ultimate cost of highway construction and maintenance. They are adding to their bituminous surface courses small amounts of compatible *elastomeric* (rubber) hydrocarbons, such as Naugatuck's SURFA-SEALZ\*. This involves no extra equipment... adds little to the total cost of highway building or resurfacing... promises substantially longer paving life and greatly reduced maintenance!

Write for complete details on SURFA-SEALZ, the modern roadbuilder's strongest ally in stretching highway dollars!

\*Registered Trademark



**United States Rubber**  
**Naugatuck Chemical Division**  
Naugatuck, Connecticut

BRANCHES: Akron • Boston • Chicago • Memphis • New York • Philadelphia • Mfg.: Naugatuck • Gastonia • Los Angeles • CANADA: Latex Div., Dominion Rubber Co., Ltd., Montreal • Cable: Rubexport, N. Y. Rubber Chemicals • Synthetic & Reclaimed Rubber • Plastics • Agricultural Chemicals • Latexes



# Use that LOCAL Aggregate!

*NOW! Save the cost of hauling in aggregate. Make topnotch asphalt hot mix roads with hard-to-coat local aggregates and Pave.*

Pave speeds-up the complete coating of hard-to-coat aggregates . . . cuts down mixing time. The stronger Pave bond—readily shown by Immersion-Compression Testing—prevents stripping . . . provides greater resistance to water attack . . . increases road life.

Stretch your road-building dollars by using economical Pave treatment to improve hot mixes with your low-cost, local aggregates.

Let our Pave Technical Service Staff assist you with your problems in asphalt hot mix, cutback, and emulsion road work.

*Write today, our list of successful case histories might help solve your problem.*

**Carlisle Chemical Works, Inc.**  
**Reading, Ohio**

*Manufacturers of fine industrial chemicals*



. . . for more details circle 272, page 16

**ROADS AND STREETS, October, 1956**



## Mr. Nevitt's Reply

(Continued from page 108)

and any initial deficiencies in the asphalt, such as decreased adhesiveness and increased lubricity, have been compensated for — so far, at least — in the design or road maintenance.

It may be reasonably asked why we cited the Michigan recovery test in our specification discussion — a state showing leadership in highway engineering, with a specification which endeavors to do something in a field where most states have done nothing. The answer is simple. Efforts such as ours accomplish little with the less forward states, where the means, the men, or the motivation to progress are lacking. These states will move only to get on the bandwagon. We must appeal to organizations which can and will do something.

But with these the problem is often not so much action, but proper and sufficient action. Our greatest handicap to optimum bituminous design today is the presence of specifications which are better than nothing but not good enough to cover the actual situation. Base designs which attempt to describe a two-dimensional quantity by one measurement; mat thickness formulas based on the resistance to deformation by a continuously applied load of large magnitude when the actual failure results from numerous repetitions of a light load; the recovery specification, which encourages lubricating asphalts likely to produce overdense mixes after appreciable use — all these tend to halt progress towards requirements which are sound in excluding bad results, but do not also exclude good ones or aid borderline products at the expense of higher quality materials.

Michigan has now had its recovery specification for some ten years, with no studies of which we are aware to indicate it will not continue in use indefinitely; yet if there was acute awareness of the deficiencies of the test, the considerable abilities of the Michigan organization might have by now given us a better, or at least a less discriminatory, index for hardening and other asphalt quality characteristics.

H. G. Nevitt

## Bituminous Concrete Assn. sets convention date

The National Bituminous Concrete Association, Inc., has set its Second Annual meeting date to coincide with the date of the Road Show in Chicago. Its meeting will be held on January 31st and February 1 and 2, according to an announcement by Sheldon G. Hayes, President.

The following convention committee members have been appointed: William Nanini, chairman, Rock Road Construction Co., Chicago; Scott A. Baker, secretary, Michigan Asphalt Paving Assn., Lansing; George H. Hartong, George H. Hartong, Inc., LaGrange Park, Ill.; W. A. Bechtold, Payne & Dolan, Milwaukee, Wisc.; E. J. Pennig, E. J. Pennig Company, St. Paul, Minn.; William H. Lang, Mid-America Engineering Corp., Skokie, Ill.; B. E. Lathrop, Globe Construction Co., Kalamazoo, Mich.

Association Convention Headquarters will be at the Conrad Hilton Hotel in Chicago. The Association's national headquarters are at 1145 19th Street N.W., Washington 6, D.C.

## Costly new expressways planned in Newark area

A tangible idea of the costliness of free expressways contemplates in metropolitan area to relieve traffic congestion, is that given by the plans announced by the New Jersey State Highway Department for the area around Newark.

City officials in Newark have made

a strong bid for a share of the \$154,000,000 allocated to New Jersey for the next three years under the Federal Aid Highway Program. A sizable percentage of this money would go for a series of freeway routes.

## Excavator maker's history

"Designed for Digging" a 384-page illustrated history of the world's largest producer of excavating equipment, has been published by the Northwestern University Press at Evanston, Ill. It is the second volume in the University's studies in business history.

The book covers the first 75 years of the Bucyrus-Erie Co., whose excavators have rearranged more of the face of the earth than those of any other manufacturer. Illustrated with more than 180 photographs, the volume traces the company's development from its beginnings in 1880.

Written by Harold F. Williamson, professor of economics, and Kenneth H. Myers II, associate professor of industrial management, the book is one of the first business histories to deal with a manufacturer of heavy capital equipment.

## Tractors and Scrapers Flown into Arctic



● Operation DEW Line called upon Operation Airlift early this past spring to carry two Caterpillar DW20 Tractors and No. 456 Scrapers to DEW Line (Distant Early Warning) headquarters in the Arctic. The remote location meant transport over ice packs. With the spring breakup approaching, the Air Force was called on to transport the equipment from Larson Air Force Base.

The wheel tractors found quick refuge in the large C-124 transport planes, but loading the scrapers proved more tedious.

The No. 456 scrapers were stripped of wheels, pivot pins, draft beams, sheave boxes, and conduit brackets to maintain the clearances necessary to get the bowl portion into the plane. With the unit stripped, it was inched up the ramp of the plane on greased boards. A winch in the stern of the ship and four 6500-lb. bridge crane hoists within the plane gave the boost necessary to get unit into the plane.

## **Fine Aggregate Recovery And Dust Collection**

*Second-stage dust collection equipment of one type or another may be required to augment regular cyclone-type collectors, notes this author, who discussed ordinances governing dust and other considerations in planning the hot-mix plant.*

**By C. A. Gallauer**

Assistant Chief Engineer  
Buell Engineering Co., Inc.

**D**ESPITE the widespread public interest in air pollution, there is a scarcity of informed opinion as to what constitutes air pollution. And even less knowledge exists as to what, in particular cases, can and can not be done to reduce or eliminate various types of industrial air pollution. Air pollution can take many forms, as for example, smoke, gases, odors, fumes, dust and, according to some authorities, even noises. In this talk I shall confine myself to the emission of particulate matter, or dust to the atmosphere.

In response to an aroused citizenry, many communities have enacted air

pollution codes or so-called "smog laws." As is only natural, and proper, each code has been written to suit the requirements of the locality in which it is applicable. From this, one might think that the country would be blanketed with an overwhelming number of conflicting ordinances. Fortunately, however, this is not so; in fact, with regard to permissible dust emission, most codes are so uniform that they can be classified into two types. One type, covering the majority of all air pollution codes, is the code modeled after the ASME model air pollution ordinance. For example — the smoke inspection ordinance of

the city of Columbus, Ohio, is based upon the recommendations of this model ordinance.

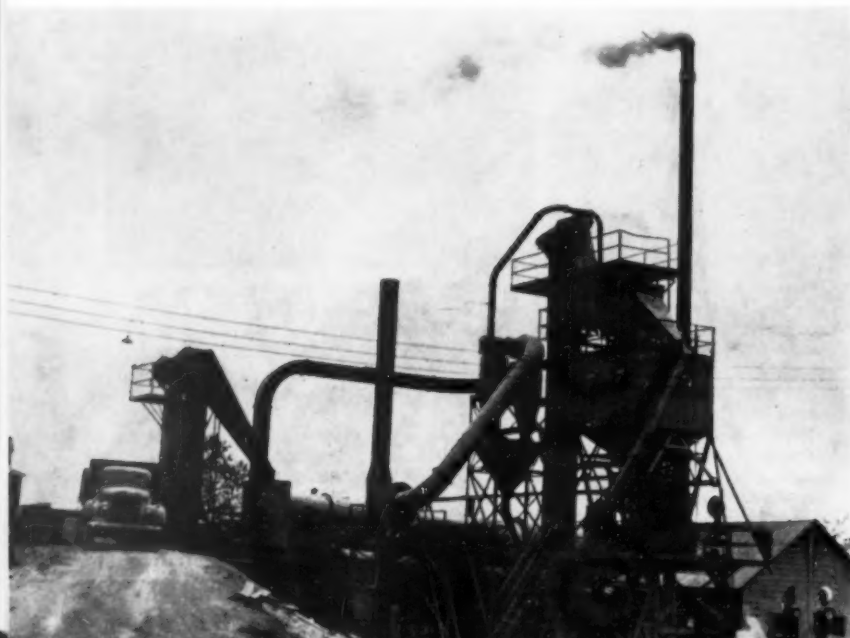
All codes based on this model place a limit on the *concentration* (not the total quantity) of dust which may legally be entrained in the gases emitted to the atmosphere by any process. This limiting concentration is set at 0.85 lb. of dust per 1000 lb. of gas, or some mathematically equivalent concentration.

It is interesting to note the origins of the "magic-number." The ASME model ordinance was originally intended to apply to coal burning boiler plants. For that reason, the limiting dust concentration is tied to a flue gas composition of 12% carbon dioxide, or approximately 50% excess combustion air. A boiler plant could not then attain the allowable dust concentration by diluting the flue gas with air. A concentration of 0.85 lb. of dust per 1000 lb. of gas is approximately equivalent to a concentration of 0.29 grains of dust per cubic foot of flue gas at 400°F. A typical pulverized coal fired boiler, without any dust collection equipment, will discharge flue gas to the atmosphere containing a dust concentration of from 1.5 to 2.5 grains of dust per cubic foot of gas. Therefore, to meet the ASME model ordinance, this plant would require dust collection efficiencies of from 81% to 89%.

### **Reasonable Values**

These are reasonable efficiency values for well designed fly ash collection equipment. Thus, it is apparent that the allowable dust concentration figure of 0.85 lb. of dust per 1000 lb. of gas was based on good practice in controlling the discharge of fly ash from coal fired boilers. Extensions of this same allowable concentration to other industries by the codes of many communities causes some of these industries considerable hardship, whereas others find it quite simple to meet the legal dust limit. It should be noted also that this type of code, wherein the dust concentration is limited, requires the same dust collection performance of small plants as large, and permits the larger plants to discharge a larger total quantity of dust.

- Asphalt plant of Central Asphalt & Paving Co., in Dayton, Ohio. Dust from drier enters the twin cyclones via rectangular duct in background. Duct splits at collectors to deliver an equal amount of dust-laden gas to each collector. Dust is collected in the hopper beneath the collector cones and returned to the production process. Dust-free gases are exhausted via fan and stack.



An entirely different type of code, from the dust emission standpoint, is that currently in force in Los Angeles County. This code is unique in that the total quantity of dust which may legally be emitted to the atmosphere from any process is a percentage of the total quantity of solid material entering the process. The allowable percentage decreases on a sliding scale so that the allowable discharge runs from 0.24 lb./hr. for a process weight of 50 lb./hr. to a maximum allowable discharge of 40 lb./hr. for process weights of 30 ton/hr. and greater.

The work of the Los Angeles Smog Board has been well publicized and there is an ever present danger that other communities, without Los Angeles' special requirements, and containing other types of industry, might foolishly adopt and try to enforce air pollution codes based upon the rules and regulations of the Los Angeles District.

### Asphalt Plants Compared

Let us now examine the asphalt plant as an atmospheric polluter, and its relationship to the various dust emission codes previously outlined.

The source of dust most difficult to control in an asphalt plant is the discharge stack of the aggregate dryer. Those same design features which make for good efficient drying, also lead to a high carry-over of dust in the gases leaving a rotary dryer. It has been our experience that the typical asphalt plant dryer, without any dust collectors at all, will have a stack dust concentration of about 20 or 30 grains per cubic foot. This concentration will, of course, depend upon many factors such as the particle size being dried and gas velocity in the dryer.

Most asphalt plant dryers are therefore equipped with dust collectors — usually cyclones — which collect dust by impressing a centrifugal force on the dust particles, so that they may be thrown out of the gas stream and collected. All cyclonic dust collectors have one thing in common, in that they collect coarse dust particles more efficiently than small ones. There are a very large number of designs of cyclone dust collectors on the market. All can collect pebbles easily and none can collect very much material smaller than 1 micron in diameter. Their performance on intermediate size ranges vary with the design, however. A well designed cyclone should collect about 90% of material having a particle size distribution similar to that existing in the typical asphalt plant dryer stack, whereas a cyclone not so well designed might only catch

● Illustrates cyclone operation. Dust-carrying gases enter the cyclone tangentially and without loss of pressure due to change in direction. Within the cyclone, the solids are thrown by centrifugal action to the cyclone wall and due to the air flow pattern, which is a descending helix at the cylinder periphery, the dust is carried downward and discharged through the conical outlet into the hopper below.

The cleaned gas ascends in a helical manner at the center of the cyclone and leaves through the outlet pipe which extends down into the cylinder.

The major factor in providing greater collector efficiency is a narrow vertical rectangular port in the upper portion of the Buell collector. This port provides an immediate outlet for fines which tend to accumulate in eddy currents which prevail in this portion of the collector. These fines are conducted through a by-pass duct to the main body of dust in the lower conical section of the collector.

The collector is properly proportioned to avoid turbulence in counter-flow gas streams and to provide a powerful vortex which discharges the dust properly into the dust chamber, at the same time enabling the dust-free gas to exit via the outlet duct.

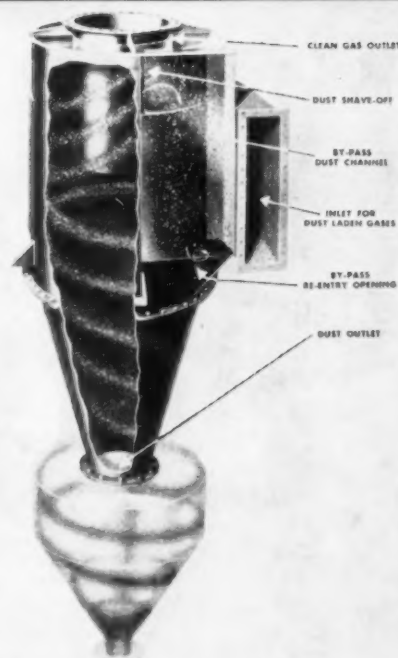
about 70 to 75% of this dust.

The dust collected by the cyclones is occasionally returned to the dryer. Obviously, this increases the proportions of the fines in the feed to the dryer, so that the dust concentration entering the cyclone collector is increased. In other words, some of the material returned to the dryer from the dust collector is immediately blown out of the dryer and again enters the dust collector. When steady conditions are reached, we find that the concentration of dust leaving the dryer has increased from, say 20 grains per cubic foot, to about 30 grains. A well designed cyclone collector, having about 90% over-all collection efficiency, will then lose 10% or 3 grains per cubic foot to the stack.

It is very significant if we consider that, in order to meet either of the two dust codes discussed, a typical asphalt plant dryer would have to have a stack dust concentration of no more than 0.31 grains per cubic foot. Obviously, this can not be attained in a plant equipped with only one stage of cyclone dust collectors, even if those collectors are of the most efficient types now known.

### Second Stage Collectors

In order to reduce the stack dust loss to the acceptable value, a second collection stage must be provided. The efficiency of this stage will have to be about 90% if its collected dust is discarded, and about 93% if its collected dust is returned to the dryer



along with the catch of the first stage cyclones.

The second stage collectors might consist of dry cyclones, a bag filter, a wet scrubber, or an electric precipitator. A brief run-down of the capabilities, advantages and disadvantages of these various systems would seem to be in order.

A second stage collector consisting of dry cyclones will necessarily be the same size and have the same draft loss as the primary cyclones. Thus the initial and operating costs of second stage cyclones will also be comparable. However, second stage cyclones must handle dust finer and more difficult to collect. The best collection efficiency would be about 65%, so that dust loss would still be about 1 grain per cubic foot, or more than 3 times as great as that permitted by most dust codes.

A second stage collector of the bag filter type could attain efficiencies in excess of 99%, and result in completely clear stack. However, bag filters are subject to operating difficulties when installed in an intermittent process such as an asphalt plant dryer. The temperature must be carefully controlled to prevent it from rising so high that the bags burn up, or falling so low that bags become plugged with mud due to condensation of the wet gas. Replacing a set of bags can be expensive, so that un-failing temperature control becomes an absolute necessity.

If a good wet scrubber is used as a second stage collector, the stack discharge can be reduced to the allowable concentration, since collection ef-

(Continued on page 116)

here . . . without a doubt . . . is the most useful buying catalog in your office

. . . and here are some reasons why you should be **USING IT DAILY!**

- Catalogs are **PREFILED** — Saving you time and space required to file individual manufacturers' catalogs.
- Saves you the time and inconvenience of writing to manufacturers for catalogs.
- Gives you all the facts needed **BEFORE** you make a buying decision.
- Manufacturers' names and trade names indexed alphabetically for quick reference to individual catalogs.
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Here are the manufacturers represented in Gillette's Heavy Construction Prefiled Catalog:

<p>American-Marietta Company American Steel &amp; Wire Div. Anthony Company Armco Drainage &amp; Metal Products, Inc. Arrow Manufacturing Company Austin-Western Company Baldwin-Lima-Hamilton Corporation Barber-Greene Company Blaw-Knox Company Brisco Manufacturers of Calif. Bros Boiler &amp; Mfg. Co., Wm. Buffalo-Springfield Roller Co. Butler Bin Company Carey Manufacturing Co., Philip Chrysler Corporation, Industrial Engine Div. Clark Equipment Company Cleaver-Brooks Company Cleveland Form Grader Co., The Cleveland Trencher Co., The Colorado Fuel &amp; Iron Corp., The Continental Motors Corporation Cummer &amp; Son Co., The F. D. Cummins Engine Co., Inc. Detroit Diesel Engine Div. Electric Taper &amp; Equipment Co. Flexible Road Joint Co., The Flintkote Co., The Gar-Bro Manufacturing Co. General Motors Corp. Goodall Rubber Company Harnischfeger Corporation Heil Company, The Heltzel Steel Form &amp; Iron Co., The Henry Manufacturing Co., Inc.</p>	<p>Hough Company, The F.G. Huber-Warco Company, The Ingersoll-Rand International Harvester Co. Jackson Vibrators, Inc. Joy Manufacturing Company Keystone Asphalt Products Company La Crosse Trailer Corporation Le Roi Company Le Tourneau-Westinghouse Co. Littleford Bros., Inc. McKiernan-Terry Corporation Mid-Western Industries, Inc. Minneapolis-Moline Company Nauvotuck Chemical Div. Owen Bucket Company, The Phoenix Products Company Pioneer Engineering Works, Inc. Prehy Company Republic Steel Corporation Rogers Brothers Corp. Seaman-Andwall Corporation Servicised Products Corp. Shawnee Mfg. Co., Inc. Stow Manufacturing Co. Symonds Clamp &amp; Manufacturing Co. Timken Roller Bearing Co., The Toncan Culvert Manufacturers Association United States Rubber Company United States Steel Corp. United Steel Fabricators, Inc. Wellman Engineering Co., The Westinghouse Air Brake Co. Wick Wire, Spencer Steel Div. Wico Electric Company Williams Bucket Div. Williams Form Engineering Corp. Wisconsin Motor Corporation</p>
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HERE'S JUST ONE REASON WHY THE **NEW**

# MADSEN HOT ROD

## MODEL 391 ASPHALT PLANT

...stands out in the industry for fast, efficient and economical performance—the kind that means consistently more production and greater owner profits.

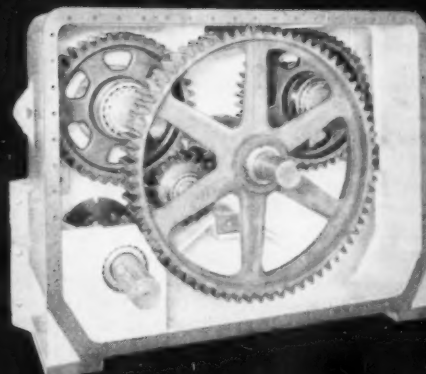


Here is the new MADSEN HOT ROD Model 391 Asphalt Plant in operation. This is a 5000-lb. plant, producing in excess of 200 T.P.H. of quality mix. The HOT ROD Asphalt Plant is available in capacities of 3000-lbs., 4000-lbs. and 5000-lbs.

### THERE'S NOTHING LIKE IT IN THE INDUSTRY!

For the first time in an asphalt plant... a FULLY-ENCLOSED GEAR BOX REDUCTION THAT GOES RIGHT TO THE MIXER SHAFTS! This MADSEN-designed drive accomplishes the huge reduction in speed from the diesel engine or electric motor to the mixer shafts in a simple, free-running, dust-tight manner. It eliminates the exposed mixer timing gears and the pressure injection pump motor.

The gear case receives the in-coming power from a straddle-mounted V-belt driven multiple groove sheave. A simple enclosed chain coupling connects with the in-going side of the gear box. From here on we have the pinion and mating cut tooth bull gear. On the out-going shaft of the latter is another pinion which meshes with the idler gear, and the two mixer timing gears. A power output shaft drives by simple chain through a fully-enclosed clutch to the pressure injection pump. The twin mixer shafts are coupled into out-going stub shafts on the gear box by simple internal-external gear-type couplings. Simple, practical, economical... this drive is an outstanding contribution to the overall efficiency of the MADSEN HOT ROD Asphalt Plant.



MIXER DRIVE TOTALLY ENCLOSED — RUNNING IN OIL  
Photo shows interior of MADSEN GEAR BOX REDUCTION. In-coming power enters through shaft at lower left. The cut-tooth gear assembly, on rugged shafting and anti-friction bearing units, is fully enclosed, runs in oil.

For greater profits in the big road-building years ahead... put the outstanding MADSEN HOT ROD to work!

Ask your MADSEN Distributor for Catalog No. 391.



*Equipment that Serves.*



**MADSEN WORKS**  
BALDWIN - LIMA - HAMILTON  
CONSTRUCTION EQUIPMENT DIVISION  
DIVISIONS: Austin - Western • Eddystone •  
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ASPHALT PAVING PLANTS • PUG MILL MIXERS • AGGREGATE DRYERS • DUST COLLECTOR UNITS  
ROAD PUG TRAVEL-MIX PLANTS • WEIGH BATCHERS • SUPER FLOAT AND JOHNSON FLOAT FINISHERS  
ASPHALT TANKS • ROYAL CROWN PUMP VALVES • ASPHALT AND FUEL PUMP UNITS

... for more details circle 243, page 16

ROADS AND STREETS, October, 1956



## with a **ROSCO**

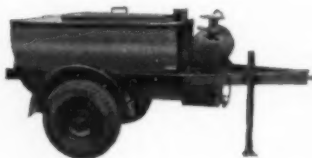
That's a photo of Francis Willette of the Willette Excavating Co. blacktopping the 8300 sq. yd. parking lot of the Dunwoody Institute in Minneapolis. His Rosco MODEL RHU MAINTENANCE DISTRIBUTOR is making money on every job. Quick to start and get going, the RHU is designed for economical bituminous maintenance and limited construction. It has many of the features required by contractors . . . as well as municipalities. For driveways, alleys, streets, parking lots, shoulders, re-shaping curves, patching, sealing and a host of other jobs . . . Model RHU will get YOU "into the profit picture". Check the money-making features with your Rosco dealer. He'll show you what Model RHU can do for you. 800 to 1000 gallon capacity.



2-Wheel Model RMT Maintenance Unit with front mounted heaters and rear mounted pump and engine is available in 400, 500 or 600 gallon sizes.

## ROSCO ASPHALT KETTLES

Used by contractors, highway departments, roofers and waterproofers for heating and melting all types of bituminous materials. Two-pass heating system, ruggedly built. Capacity 2, 3 or 4 barrels.



**Rosco**  
MINNEAPOLIS

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3118 SNELLING AVE. • MINNEAPOLIS 6, MINNESOTA

... for more details circle 252, page 16

## Fine Aggregate Recovery

(Continued from page 113)

iciencies of 90% to 95% can be attained. The first cost, space requirements and draft loss will, in general, be similar to that for dry cyclones. However, there must be a plentiful supply of water and facilities for disposal of the collected sludge. If sufficient space for a settling pond is available, the water can be reused. If the water supply and sludge disposal problems can be solved, the second stage wet scrubber is probably the most economical and satisfactory solution to the problem.

## Electronic Precipitator

The only other type of collector which can satisfactorily clean up the stack is an electric precipitator. These devices have been widely used for dust collection in larger plants, such as utilities and cement plants, but to my knowledge, have not yet been installed in any asphalt plant. The efficiency of an electric precipitator is independent of the particle size of the dust and depends only upon the electrical resistivity of the dust and certain gas ionization constants. An electric precipitator can be designed for any desired collection efficiency, simply by making the precipitator larger for higher efficiencies.

The first cost of a precipitator will be in the neighborhood of 3 to 5 times the cost of cyclones, but the operating cost will be slightly less because the draft loss is extremely low. The power requirements are quite low, running about 1 KVA per 5,000 CFM of gas treated, which is substantially less than the fan power required to overcome the draft loss through a cyclone installation.

It has been noted that the required total dust collection efficiency of 99% can not be reached with dry cyclones alone, and requires a combination of the most efficient dry cyclones and wet collectors available to attain that efficiency with two stage collection. Theoretically, it is possible to attain 99% over-all efficiency with a bag collector, or electric precipitator, alone, thus eliminating the first stage of dry cyclones. However, this would not be good practice.

In the case of a bag collector, there are a number of possible emergencies which might necessitate the collector being removed from service for a short time. A first stage cyclone collector which will attain 90% collection efficiency, will keep the stack loss at a reasonable value so that the plant can still be operated during the bag

collector outage. If the cyclone collector had been eliminated, the dryer would have to be shut down during the outage of the bag collectors. In addition, the cyclone collector reduces the quantity of dust to be handled by the bag collector which results in a longer bag life and more satisfactory all-around operation.

All of these arguments also apply to the installation of an electric precipitator alone, without a first stage cyclone collector. In addition, it is more economical to attain 99% overall efficiency by collecting 90% of the dust in the cyclones and 90% of the remainder in the precipitator than it is to design the precipitator for the entire 99% collection. Furthermore, the combination is less sensitive to changes in gas volume throughout as the efficiency responses of each collector to gas volume changes are complementary.

#### In Conclusion

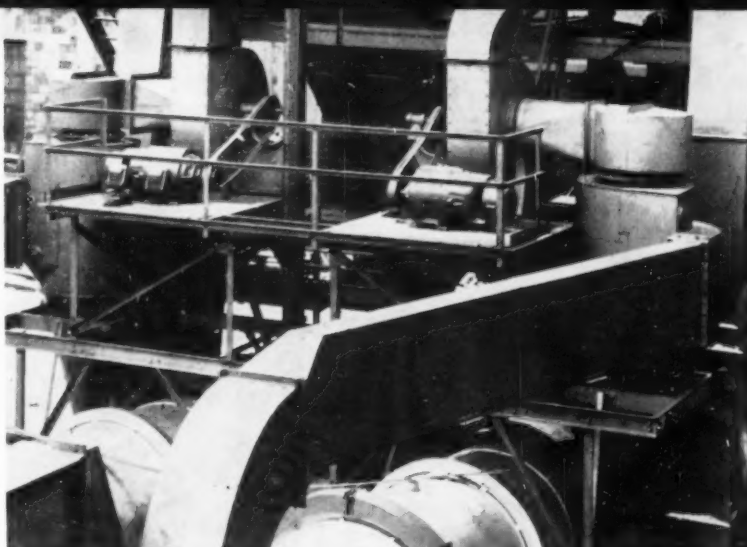
In conclusion, I would like to summarize those points which deserve some emphasis. Asphalt plant drying operations produce a large quantity of dust due to the design of the dryer and the characteristics of the material being dried. The installation of high efficiency cyclone dust collectors alone, while effecting a great reduction in the quantity of dust discharged from the stack, can not by themselves reduce the exit dust concentration to a level which would be acceptable by many municipal dust codes now in force. If it is necessary for a particular plant to conform to a dust emission ordinance, that plant must install second stage dust collectors. If water supply and sludge disposal facilities are adequate, a wet scrubber or wet cyclone is the most economical and satisfactory means of reducing the stack discharges.

If these facilities are not available, the only remaining alternative is the installation of an electric precipitator which, although initially quite expensive, will in the long run, provide a very satisfactory solution to the stack discharge problem.

#### Asphalt Institute expands

The Asphalt Institute has moved to strengthen its field engineering forces in anticipation of the expanding Federal-aid road-building program. Headquarters officials have also begun a re-examination of the Institute's five geographical divisions with a view to possible realignment of boundaries for more efficient coverage.

The double-barrelled move was the result of a directive received at the In-



• Showing another collector arrangement, this one at the Borough Asphalt Plant, Bronx, City of New York. Photo taken while plant was under construction. Each cyclone serves as an independent dryer.

stitute's board of directors' midyear meeting. It was felt that the present 22-man field engineering staff is inadequate to furnish continuing service to the 48 states when the highway program shifts into high gear. Early action is expected to take the form of new district engineering offices to be set up in those western and southern states where the Bureau of the Census anticipates fastest population growth in the next two decades.

In another outgrowth of the California meeting, Institute engineers turned to a critical study of present design and specifications. This study will insure adequate designs for the steadily rising volume of automobile and truck traffic which is creating new conditions of wear and stress on all pavements.

#### Uniform Code Committee Approves New Changes

The National Committee on Uniform Traffic Laws and Ordinances, meeting recently in Chicago, adopted numerous changes to the Uniform Vehicle Code, as recommended by nine subcommittees. Important changes approved in the Code included:

- Absolute speed limits (in lieu of present prima facie limits) with a maximum limit for rural highways of 60 mph., 30 mph in built-up areas, and a new limit of 45 mph for vehicles towing house trailers. Elimination or modification of the lower night limit will be submitted to mail vote.
- Extension of police officer's authority to arrest for specified serious offenses, such as driving while drunk and hit-and-run.
- Increase in minimum liability requirements under financial responsi-

bility laws to \$10,000/\$20,000/\$5,000 (in lieu of present \$5,000/\$10,000/\$1,000).

- New certificate of title act which is separate from registration provisions and which includes provisions for notation of liens and other security interests.

- Various changes in lighting requirements, such as increase in number of auxiliary passing and driving lamps, and amendment of farm equipment lighting requirements and permissive use of three identification lamps on front and rear of vehicles over 80 in. wide.

- Regulation of hydraulic brake fluid.

- Various amendments relating to traffic signs and markings and observance thereof, including provisions for the new "yield right-of-way" sign.

All changes adopted by the National Committee including those which may be made as a result of reference to a letter ballot, when perfected by the legislative draftsman, will be made available to users of the NHUC-AAMVA comparison workbooks. These workbooks have been provided appropriate officers in all 48 states and are currently being used to facilitate comparison studies of existing state laws with the Uniform Code.

- Four-lane divided highway construction is being pushed rapidly in Michigan according to the state highway department. More than 197 miles of such new construction will be opened by the end of the year.

This new mileage will be part of a two-year program totaling 450 miles of four-lane roadways, approved for the 1956-1957 period at an estimated cost of \$304.5 million.



# What's New in Equipment and Materials

Reader Service Coupon on Page 16



Marion 35-M 3/4 Yd. Machine

## 3/4 Yd. Shovel; 18 Ton Crane

A 3/4-yd. shovel and 18 ton crawler crane described as "new from cats to boom point" has been announced by Marion Power Shovel Co., Marion, O. It will be known as the 35-M and will be offered both with crawler and truck mountings. The truck crane will be known as the 35-MR and is rated at 25 tons.

Principal design and construction features include:

Fast, easy convertibility of front-end equipment (shovel, dragline, clamshell, crane, hoe) without any machinery changes.

Low-maintenance self-cleaning, non-clogging crawlers which feature a drive sprocket design that sheds dirt and close-spaced crawler shoes to prevent wedging of material.

Independent boomhoist for power up, power down control of the boom as standard equipment.

Anti-friction bearings on high speed rotating parts and hook rollers. Optional features include torque converters, independent travel, high gantry for booms over 55 ft., power removable counterweight, optional crawler mountings.

For more information circle 111 on Service Coupon Page 16 and mail now.

## Hot Oil Heaters

A new "D" model line of circulating hot oil heaters has been announced by Childers Manufacturing Co., Inc., Albuquerque, N. Mex.

The new "D" models incorporate the exclusive Childers circular radiating fins which guide the oil through the heater and eliminate the possibility of dead spots and resultant oil deterioration. These hidden fins are claimed to provide additional radiating surfaces which heat the circulating oil and result in greater economy. The Childers exclusive down-draft principle of firing provides the utmost in efficiency by utilizing every bit of the burnt fuel for heating purposes.

The jacketed heat tube and combustion chamber of the "C" model heaters are again used in the "D" model heaters, but they are now insulated.

The new "D" models were designed and are fabricated to provide complete coverage of the heavy oil heating market. The four models, namely D-50, D-100, D-150, and D-250 replace the old "C" models, C-50, C-100, C-75, and



Model D Hot Oil Heater

C-200. Heating capacities are greatly increased over that offered by the "C" models. Two models were added to the line as a result of a comprehensive market survey conducted by the Childers Company in which road contractors were contacted as well as Childers distributors throughout the nation.

For more information circle 112 on Service Coupon Page 16 and mail now.

## Ottawa Hydra-Hammer Has New Features

Hydraulically controlled tower tilt and lay-down, improved engine cover which can be locked against theft, adjustable seat and brake pedal, hydraulic transmission and shock accumulator, rear fenders, and a streamlined appearance are among the features of the newest model Ottawa Hydra-Hammer, a product of Ottawa Steel Division, L. A. Young Spring & Wire Corp., Ottawa, Kan.

The tower traverse arrangement on the Hydra-Hammer enables fast, smooth horizontal left or right movement of the tower, while still maintaining a vertical position. A 4 ft. path can be broken or compacted to original density in 4 to 6 ft. lifts with direct — not glancing — blows. A trouble free creep speed is accurately controlled by the brake pedal.



1957 Model Ottawa Hydra-Hammer

For more information circle 113 on Service Coupon Page 16 and mail now.

## EnginScope Locates Engine Trouble

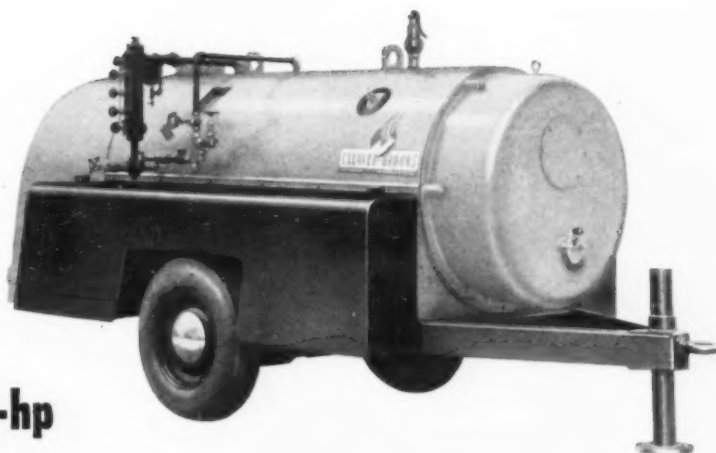
An instrument, the EnginScope, for locating engine trouble has been placed on the market by Allen B. Du Mont Laboratories, Inc., 750 Bloomfield Ave., Clifton, N.J.

The EnginScope resembles a portable television receiver. In operation it is connected to an ignition system by two simple signal clips. Throughout the testing procedure the leads are never moved from their original connection points. Ignition troubles show up on the instrument's TV-like screen in the form of patterns of light. By observing these patterns the mechanic can tell in a few

(Continued on page 121)



# New!



**Cleaver-Brooks 50-hp**

## **PS-50 PORTABLE STEAMER** **twice the steam and work capacity!**

**Job-test this husky heater NOW!**

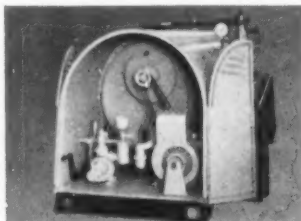
**I**F you've ever owned or operated a Cleaver-Brooks 2- or 3-car heater — you *know* Cleaver-Brooks' work capacity! *That's why this new rig — with twice the capacity, offers more value than ever before.*

Surveys among contractors, municipalities, state and county highway departments prove the need for the new PS-50. They show this extra capacity is essential to economically handle scores of extra jobs constantly added to yearly work schedules.

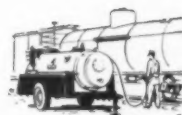
The PS-50 PORTABLE STEAMER is the huskiest ever offered in its price range. It has the same high-quality design advantages of America's most modern boilers: quick steaming from a cold start . . . delivers 1725 lbs. of dry steam per hour . . . has proved economy of famous four-pass, forced-draft construction. Fully equipped — ready to GO!



**TOWS ANYWHERE WHEELS CAN ROLL** — Fender tanks carry 45 gals. water, 45 gals. fuel-oil, 8 gals. gasoline. Completely insulated, weatherproof. Attractively painted black and orange. Size: 13'-0" long, 5'-3½" wide, 6'-0" high overall.



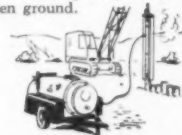
**FRONT END OPENS WIDE** — More room for components. Greater ventilation means cooler running engine . . . more operating convenience. Removal of 6 bolts opens rear head for fast cleaning. ASME code constructed.



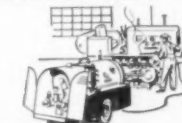
**HEATING** — tank-cars, bituminous materials, asphalt, oil, aggregate, jacketed lines, water for masonry, heavy fuel oil.



**THAWING** — culverts, water mains, pipe lines, gravel, shot holes in frozen ground.



**STEAM SUPPLY** — for pile driving, soil sterilization, aggregate dryers, steam atomizing burners.



**CLEANING** — construction equipment, buildings and structures, de-vaporizing fuel tanks, and the like.

**JOB-TEST THE PS-50 PORTABLE STEAMER NOW . . . write or phone for illustrated catalog.**

A product of Cleaver-Brooks Company, Dept. L, 395 E. Keefe Ave., Milwaukee 12, Wisconsin

**Cleaver Brooks**

25th  
YEAR

**TWENTY-FIVE YEARS OF LEADERSHIP BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER**  
... for more details circle 194, page 16

**ROADS AND STREETS, October, 1956**

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STANDARD MC-3 Cut Back Asphalt is applied to Boulder County Highway 10. Standard Asphalt engineer Oscar Jones (left) and Highway Superintendent Douglas N. Stewart check application.



## Ordering STANDARD Asphalt

*makes job easier for Boulder County Highway Department*



As the link between Longmont and State Highway 66, Boulder County Highway 10 gets plenty of traffic. To take this traffic, road is surfaced with STANDARD Asphalt.

Boulder County Highway 10 in Colorado links the city of Longmont with State Highway 66 three and a half miles to the west. It is a popular highway for travel to Rocky Mountain National Park and for farm-to-city traffic. Maintenance of this highway in first class, all-weather condition is made easy by the use of STANDARD Asphalt. The Boulder County highway department gets these benefits from ordering asphalt requirements from Standard: (1) top quality product and (2) an assured source of supply.

**And there are still more advantages** to ordering asphalt from Standard Oil. Standard's experienced asphalt salesmen know the needs of road builders and are qualified to work with them in planning requirements. Standard Oil has long experience as an asphalt supplier, knows what it means to protect customers on supplies and deliveries.

**You can get these advantages** when you buy asphalt from Standard. Find out. Call your nearby Standard Oil Office in any of the 15 Midwest and Rocky Mountain states, or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Highway 10 running west of Longmont, Colorado to State Highway 66 is 24 foot wide, asphalt surface, all weather highway. Standard Oil's Oscar Jones and Highway Superintendent Douglas N. Stewart inspect road recently resurfaced.



**STANDARD OIL COMPANY (Indiana)**



## New Equipment



EnginScope Testing Ignition System  
Operations of Engine on Transit Mixer

seconds the location and nature of many engine faults. It can detect a wide variety of engine ailments including fouled, misfiring, open or shorted spark plugs; defective coils, condensers, wiring and switches; worn distributor cam and shaft bearings and burned distributor points.

For more information circle 114 on  
Service Coupon Page 16 and mail now.

### Brush Cutter

A new brush cutter for clearing brush, heavy undergrowth and overhanging branches, has been announced by McCulloch Motors Corporation, 6101 W. Century Blvd., Los Angeles 25, Calif.

The cutter has a 6-ft. reach, and a 10-in. circular saw blade for quick, easy cutting. The complete unit, including engine, weighs only 28 lb. and can be operated easily by one man. With accessories, it can be converted into a chain saw or all-purpose drill.



New McCulloch Brush Cutter

For more information circle 115 on  
Service Coupon Page 16 and mail now.

### Heavy Duty Trafficcone Barricade Unit

A new heavy duty Jumbo barricade unit, introduced by Interstate Rubber Products Corp., Dept. R1, 908 Avila St., Los Angeles 12, Calif., consists of two



JACKSON PAVING TUBE  
(INTERNAL TYPE)



JACKSON SIDE FORM  
VIBRATOR



JACKSON VIBRATORY  
SCREED



JACKSON POWER PLANT

**FOR SALE OR RENT  
AT YOUR JACKSON  
DISTRIBUTOR**

## FOR MORE PROFITABLE PAVING



Jackson Multiple Vibratory Compactor

### MACADAM BASE COURSES, SUB-BASES, SOIL-CEMENT PAVING, FILLS

The JACKSON MULTIPLE COMPACTOR has now thoroughly demonstrated that it is by far the most advantageous equipment for achieving or exceeding specified densities in rock, slag, sand, gravel . . . all granular soils used in waterbound and penetration macadam construction, and in filling the voids in rock and slag courses with fines. The Jackson does it in about half the time required with other types of equipment. It is equally efficient for consolidating large granular soil fills such as bridge approaches and kindred projects.

### JACKSON INTERNAL TYPE PAVING TUBE

Supplied with extraordinarily powerful motors, no concrete highway or airport paving job is too tough for this improved machine. Tubes vibrate deep in concrete, quickly plasticizing harsh dry mixes in slabs to 24" thick and as wide as 25'. It saves time, saves cement; provides greater density and compressive strength. Cuts spreading costs where no spreader is used. The tube is made up of one unit as shown for each 5'-0" (maximum) of slab width. Usually attached to front of finisher and controlled by finisher operator. Power is supplied by a Jackson Power Plant mounted on the parent equipment. Use of a JACKSON Side Form Vibrator on standard finisher assures thorough consolidation and plasticity of concrete at side and center forms — with no "missed" spots. Labor savings effected quickly repay cost of equipment.

### MUNICIPAL PAVING — BRIDGE DECKS, ETC.

For jobs of this type a JACKSON Vibratory Screed and Portable Power Plant is the most convenient, productive and inexpensive outfit you'll find anywhere. Strikes off to any crown, undercuts at curb and sideform, works right up to and around all obstructions. Two men easily handle it on all slabs up to 30 feet wide, and it may be rolled back for second passes on 4 rollers.

**PORTABLE POWER:** Thoroughly reliable, time-proved plants in capacities of 1.5 to 7.5 KVA . . . equipped with permanent magnet generators requiring no maintenance or adjustment. They provide both single and 3-phase 120V., 60 Cy., AC and may be used for lights as well as operating all JACKSON equipment.

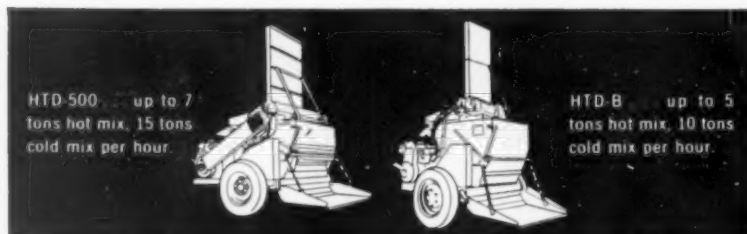
**JACKSON VIBRATORS, INC.**  
LUDINGTON MICHIGAN



## LOW COST PRODUCTION OF BITUMINOUS PAVING MIXTURES

McConnaughay Mixers are setting records for hot or cold patching and small resurfacing jobs *in any season!*

**W**ORKING right on location, McConnaughay HTD Mixers are setting remarkable records for low cost production of bituminous paving mixtures... used for hot or cold patching and small resurfacing jobs in any season. Illustrated above is a Model HTD-500 at work on a street patching job. It provides the exact amount of material needed for fast, easy work with a small crew. Important, too, McConnaughay HTD models effectively remove both moisture and solvents from bituminous mixtures... patches and resurfaced areas set up hard as soon as the applied mixture cools. Write, wire, or 'phone for details and specifications today.



HTD-500 up to 7  
tons hot mix, 15 tons  
cold mix per hour.

HTD-B up to 5  
tons hot mix, 10 tons  
cold mix per hour.

**K. E. MCCONNAUGHAY** National distributors: Asphalt  
Equipment Co., Inc., 3929 Buell  
LAFAYETTE, INDIANA Drive, Fort Wayne, Indiana



Jumbo Barricade Unit

entirely new components, a 24 in. square Jumbo base and a 36 in. Jumbo adapter sign, combined with the standard 28 in. barricade cone. The Jumbo base slips over and interlocks with the barricade cone to make an integrated unit. Two such base-cone units support the new 36 in. Jumbo adapter sign creating a maximum barricade easily seen by motorists.

A single Jumbo base and barricade cone can also be used with a 12 in. pilot adapter sign in windy areas. High stability factor of the 9-16 Jumbo base is stated to allow the base-cone unit to withstand wind velocities up to 60 mph.

For more information circle 116 on Service Coupon Page 16 and mail now.

### Carry-Hook for Scarifiers

A new manually-operated carry-hook is now furnished on all current-model TerraTrac crawler-tractors equipped with hydraulic scarifiers, according to announcement from American Tractor Corp., Churubusco (Ft. Wayne), Ind. The carry-hook, designed to take weight off hydraulic cylinder when scarifier is not in use, is easily engaged or released by lever from operator's seat. Like all front and rear-mounted equipment available with TerraTrac crawlers, these scarifiers are designed, built and fully warranted by American Tractor. They are available with 4 or 5 removable teeth on all 8 TerraTrac diesel and gasoline-powered loader and dozer models, from 36 to 62 hp.



Carry-Hook Mounted on Tractor

For more information circle 117 on Service Coupon Page 16 and mail now.

### Shawnee Backhoe Digs 14 ft. Deep

A new backhoe, model number D90,



has been placed on the market by Shawnee Manufacturing Co., Inc., 1947 N. Topeka, Topeka, Kan. The new "Chief" is stated to dig effectively at the 14 ft. level, but its actual reach below the ground surface is 15 ft. In addition to its extreme digging depth, the "Chief" is stated to offer exceptional power by synchronizing the action of a push cylinder at one end of the bucket boom axis with another pull cylinder midway between the axis and the bucket. Utilizing the two synchronized cylinders relieves strain on the axis and increases digging pressure.

Working efficiency of the new Shawnee Chief has also been accomplished by providing three 120-degree quadrants of operating — the operator may switch the boom to either of the quadrants without moving from his seat. Hydraulically controlled "feet" stabilizers quickly align the tractor for plumb digging such as when working sideways on a hill or with one wheel on a curbing.



Shawnee "Chief" Backhoe and Shawnee "Loadmaster" Loader

For more information circle 118 on Service Coupon Page 16 and mail now.

### Engine Driven Welder

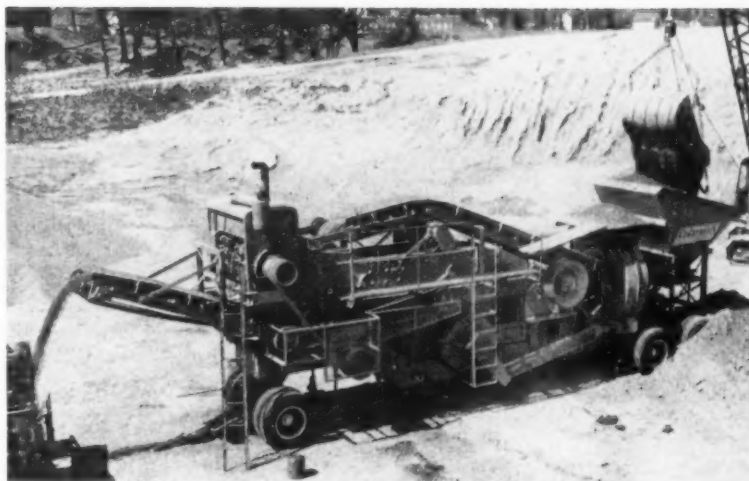
A new engine driven welder, with battery starter and direct coupling between engine and generator, has been announced by the General Electric Company's Welding Department, Schenectady 5, N.Y.

Available in 300- and 400-ampere models, the new welder includes reversing switch, battery start and side panels as standard equipment. Built to withstand heavy duty service, the new welder is constructed of extra heavy steel and has no projecting generator or controls that could be damaged in on-the-job operation.

Gasoline driven models are equipped with Hercules JX4 engines, rated 54 hp. at 2150 rpm.



New 300-Ampere Engine Driven Welder



Cedarapids Junior Tandem Crushing and Screening Plant

Both the 300- and 400-ampere models have a duty-cycle of 60 per cent, rated temperature rise of 50 C, open circuit voltage of 80, and operate at maximum rpm of 2150.

The 300-ampere unit, designated 30AG, has a welding range of 60 to 375 amperes, and electrode capacity of  $\frac{3}{16}$  to  $\frac{1}{4}$ . The 40AG, rated 400-amperes, has an operating range of 80 to 500 amperes, and electrode capacity of  $\frac{1}{4}$  to  $\frac{5}{16}$ .

For more information circle 119 on Service Coupon Page 16 and mail now.

### Crushing and Screening Plant

The "all-new" Cedarapids Junior Tandem crushing and screening plant has been redesigned to give it greater versatility and increased capacity, according to an announcement by Iowa Manufacturing Co., Cedar Rapids, Ia.

A larger screening area is one of the big new features on the redesigned Junior Tandem. A half deck has been added to the horizontal vibrating screen, and the screen width has been increased by 6 in. over the old model. The 42 in. x 10 ft., 2½ deck screen on the new Junior Tandem not only increases screening capacity but also adds flexibility for producing from one to three products simultaneously in sizes ranging from 2 in. road ballast down to minus ¼ in.

In the newly designed Junior Tandem plant, the owner can choose the crusher sizes that will best fit his particular pit conditions. Where large amounts of over-size are encountered, the 10 in. x 36 in. jaw crusher can be used for the extra primary capacity necessary to keep the plant operating at peak capacity. In average pit conditions, the 10 in. x 24 in. jaw crusher handles primary reduction.

Secondary crushing is handled by either a 24 in. x 16 in. or a 30 in x 18 in. roll crusher. For average conditions in the pit, the capacity of the smaller secondary crusher is adequate for balanced plant operation. Where percentages of fines are high, or where greater over-all plant capacity is desired, the

larger secondary crusher with its 18 in. width is said to increase secondary crushing capacity by 11%, while the 30 in. diameter roll permits feeding bigger material so that the primary crusher jaws can be opened wider.

Crusher sizes can be matched or mixed in any combination to adapt the Junior Tandem to whatever crushing conditions are encountered.

For more information circle 120 on Service Coupon Page 16 and mail now.

### Portable Emergency Traffic Control Kit

The Lyle Saf-T-Pak, a portable emergency traffic control kit, has been announced by Lyle Sign Co., 2722 University Ave. S.E., Minneapolis 14, Minn.

This new unit is unfolded, ready to work in less than a minute, an aid for fires, accidents and all other emergency or temporary traffic situations where added traffic control is needed. It is designed for use by contractors, police and fire departments, public utilities, schools, airports and civil defense.



Portable Emergency Traffic Sign

Reflective sheeting on sign panels and signal flags provide high visibility day or night. Optional blinker lights increase authority and visibility at night.

The sign kit opens like a suitcase; the two sides fold down and are locked tightly in place by triangular metal plates that are also utilized to keep the unit locked when not in use. The sign stands solidly even against strong winds.

For more information circle 121 on Service Coupon Page 16 and mail now.

### Brake Lining for Construction Equipment

Flexible molded brake lining material specifically designed for use on both

internal and external drums has been introduced by the Raybestos Division, Raybestos-Manhattan, Inc., Bridgeport, Conn. This is stated to eliminate the need for two types of brake lining.

Available in 25-ft. rolls and in sheets 12½ ft. long by 12 in. wide, the new Raybestos Industrial Flex-Molded (RIF) brake material is made in thicknesses of ¼, ⅜, ½, and ¾ in.

Brass alloy chips are incorporated in the brake material to improve heat transfer, prevent overheating. This increases brake efficiency and brake life.

For more information circle 122 on Service Coupon Page 16 and mail now.



## Presents A New Completely Portable, Batch Type Asphalt Plant

### The H & B Mobile 40 (100-120 TPH Capacity)



Portable Dryer Unit



Gradation Unit, showing operator's platform.

- All Units Wheel Mounted
- No Crane Needed for Erection
- Meets All State Specifications
- All Piping and Wiring permanently installed with quick disconnects.
- All Advantages of Batch Plant
- No Shafts, Universal Joints, Chains, Gears, etc.  
All remotely located units driven with electric motors.
- Flexible Set-up Arrangement
- Complete Plant (tanks, oil heater, power units, piping, etc.) available from one source.

For complete specifications and information see your H & B distributor or write direct to

## HETHERINGTON & BERNER INC.

Engineers • Manufacturers

721 KENTUCKY AVE.

INDIANAPOLIS 7, INDIANA

... for more details circle 219, page 16

## Manufacturers' Literature

### Report on Corrugated Culvert Under High Fill

A report entitled "84-in. corrugated metal pipes handle 137-ft. fill" has been published by Arnco Drainage & Metal Products, Inc., Middletown, Ohio. Free on request, this folder describes and pictures an unusual culvert installation made on U.S. highway 31 in Alabama, together with test measurements on the settlement and performance of this culvert under the high fill.

For more information circle 123 on Service Coupon Page 16 and mail now.

### Motor Grader

Operating and mechanical features of the all-purpose Caterpillar No. 112 motor grader are discussed in a booklet (Form 31903) released by Caterpillar Tractor Co., Peoria, Ill.

For more information circle 124 on Service Coupon Page 16 and mail now.

### Case History 12 Major Tunneling Projects

A study of 12 major tunneling projects is contained in Report No. 8, available from The Master Builders Co., 7016 Euclid Ave., Cleveland 3, Ohio. Each case history is a report of the excavating and concreting problems encountered and successfully solved on these projects. These case histories tell how Pozzolite was used to help solve the concreting problems. The three basic tunnel types, highway, railway, and water tunnels and their construction techniques are clearly illustrated by photos and accompanying texts.

For more information circle 125 on Service Coupon Page 16 and mail now.

### Alloy Steel Tractor Parts

A new 6-page, 2-color pamphlet on manganese steel tractor replacement parts, prepared by the AMSCO Division of the American Brake Shoe Co., Chicago Heights, Ill., illustrates and points out the advantages of manganese steel in track shoes, scraper blades, end bits, sprocket and idler rims, and grouser bars. The brochure also includes a section on the proper procedure for welding on replacement manganese steel sprocket or idler rims. For a copy, write to AMSCO, Dept. T, Chicago Heights, Ill.

For more information circle 126 on Service Coupon Page 16 and mail now.

### Cut-Back and Emulsion Sprayers

A new Bulletin CG-34, "Littleford Cut-Back and Emulsion Sprayers," is available from Littleford Bros., Inc., Box 75, 454 East Pearl St., Cincinnati, Ohio. Units described and illustrated include

the Model 93-OB, 120 to 200 gal. capacity, equipped with burner, fuel tank and heating unit and Littleford's Model 93-AH, a low cost operating unit that fits any standard size commercial drum. An additional outstanding feature described is Littleford's safety type construction which is designed to greatly decrease the danger of fire.

For more information circle 127 on Service Coupon Page 16 and mail now.

### Traffic Signs and Reflective Pavement Marking

A new, revised catalog covering its complete line of traffic control signs and reflective materials has just been released by Cataphote Corporation, Toledo 10, O. All signs with standard legends and meeting State and U. S. Standard specifications are described in this buying guide plus special signs, posts and mounting accessories. The 3-color, loose-leaf catalog with price list covers street name and standard traffic signs that are available in aluminum or steel, reflectorized or plain. It also illustrates and describes Cataphote reflective materials including pavement marking compound, buttons, beads and a new brilliant coating for signs that lowers reflectorizing costs.

For more information circle 128 on Service Coupon Page 16 and mail now.

### Diesel Tractor Shovel

Structural features of the Allis-Chalmers HD-6G diesel powered tractor shovel are discussed, and the shovel hydraulic system of this tractor shovel reviewed, in the new 2-color, 8-page catalog (MS-1101) available from the Construction Machinery Division, Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Photographs, drawings and charts help convey the HD-6G's story of high output, long life, easy, time-saving servicing and show the features built into the unit for operator comfort and safety. Also included are specifications and listing of interchangeable matched attachments designed and engineered to the HD-6G to increase its versatility and performance capabilities.

For more information circle 129 on Service Coupon Page 16 and mail now.

### SWENSON SPREADERS FOR ICE CONTROL

**SPREADS SALT 200 LBS. PER MILE OR IN ANY DESIRED AMOUNT**  
**Lays a Narrow Strip or Full Traffic Lane**

Handles all granular materials — salt, cinders, sand, calcium chloride, rock chips. Spreads at speeds up to 30 M.P.H. Clutch-controlled flow: steady or intermittent for hills and intersections.

**Write for complete information**

**SWENSON SPREADER & MFG. CO.**  
LINDENWOOD, ILLINOIS



### ¾ Yd. Shovel; 25 Ton Crane

An attractive catalog describing a newly designed 25-ton lift, ¾-cu. yd. dipper capacity 305 excavator has been released by Koehring Co., Milwaukee 16, Wis. The 8-page, 2-color catalog tells the story of design, construction, work capacity and application of the new heavy-duty excavator. Well illustrated with 26 photographs and diagrams, the catalog gives concise descriptions of the Model 305 when equipped as a shovel crane, hoe or dragline. The unit is available either crawler mounted or on a truck chassis. It carries a rated lift capacity of 25 tons on rubber, 15 tons on crawlers, and can be equipped with a full complement of attachments.

For more information circle 130 on Service Coupon Page 16 and mail now.

### Heavy-Duty Trucks

A new 20-page catalog (Form number CR-674-F) which contains complete information on International 4-wheel conventional and cab-over-engine heavy-duty trucks with 6-cylinder engines is available from Consumers Relations Department, International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. Gasoline, liquefied petroleum gas, and diesel-powered models are covered. Full-color and 2-color illustrative treatment is employed throughout the book. It presents design and operating features of the 4-wheel R-line and CO models, manufactured at the company's Fort Wayne, Ind., works, as straight trucks and truck tractors including the R-185, R-190, R-200, R-210, CO-180, CO-190, CO-200, and CO-220 series.

For more information circle 131 on Service Coupon Page 16 and mail now.

### Multi-Plate for Aggregate Tunnels

A new illustrated folder (CS-9456), available from Armco Drainage & Metal Products, Inc., Middletown, O., describes the use of Multi-Plate and Limer Plate for aggregate tunnels. The folder shows actual installations. Gage tables for both metals are included.

For more information circle 132 on Service Coupon Page 16 and mail now.

(Continued on page 138)



**"THIS LUBRICANT DOUBLES THE LIFE OF GEARS"**

—says TRINITY ALPS LUMBER CO.  
Hayfork, California

"Our trucks have a forty mile county road logging haul over adverse grades, each truck making two complete round trips each working day. Our shop foreman in charge of maintenance, reports that with the use of LUBRIPLATE Lubricants there has been a minimum of truck down time and replacements of bearings and gears. The double reduction gears with LUBRIPLATE APG-140 has shown a saving of fifty per cent over previous operations."

**REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE**

### LUBRIPLATE LUBRICATION



**MAKES CARS AND TRUCKS RUN BETTER AND LAST LONGER**

LUBRIPLATE H.D.S. MOTOR OIL... THE OIL THAT NEEDS NO ADDITIVES

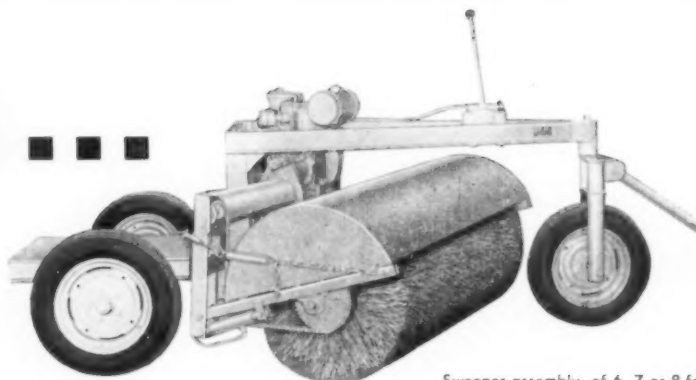
For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" ... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.



... for more details circle 259, page 16

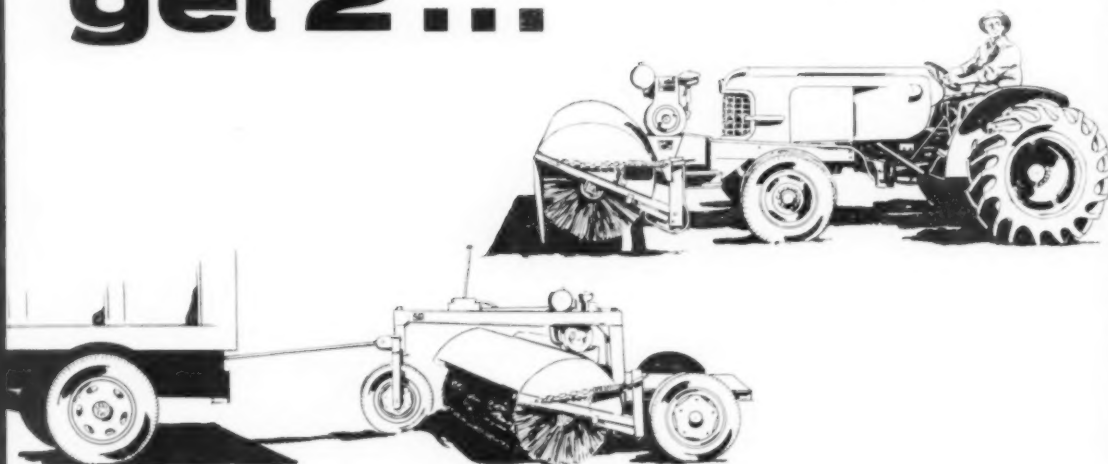
... for more details circle 239, page 16

**buy 1 ...**



Sweeper assembly, of 6, 7 or 8-foot brush AND 8 HP engine, is easily attached or detached as a unit by removing one pin. Mounting plate permits angling of brush 30°.

**get 2 ...**



**1 Little Giant Road Bird Sweeper + 1 Set FM-C Mounting Brackets = 2 Versatile Sweeper Combinations.**

Buy one Little Giant Road Bird with one set of mounting brackets and you get two different types of sweepers that can meet any of your sweeping needs.

Use the complete Road Bird, with truck, Jeep or tractor, as a tow-type sweeper . . . or use the independently-powered Road Bird sweeper assembly, with brackets mounted

on truck, Jeep or tractor, as a front-mounted sweeper.

With one sweeper you have the exact type for whatever prime mover you have available.

Ask your Little Giant distributor for more information on the profitable, convertible Road Bird Sweeper . . . or write direct.



**LITTLE GIANT  
PRODUCTS, INC.**

1530-50 NORTH ADAMS ST.  
PEORIA 3, ILLINOIS

*Manufacturers of quality products since 1918*

. . . for more details circle 238, page 16

**ROADS AND STREETS, October, 1956**



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### Drainage Engineers

FOR OFFICE WORK IN ST. LOUIS ON HIGHWAYS  
EXPRESSWAYS AND ASSOCIATED CIVIL WORKS

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- Ample opportunity for advancement based on merit
- Generous transportation & moving allowances

Plus Employee Benefit and Retirement Plan, Paid Vacations,  
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A reliable New York firm is interested in purchasing a small asphalt producing plant located in Eastern United States. Will, however, consider other areas. Kindly elaborate fully first letter. All replies held confidential.

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Learn latest methods to organize and run work. Prepare for the top jobs. Send post card for details.

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CONSTRUCTION CONSULTANTS

P.O. Box 921 Lake Worth, Florida

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60 in.	9.80
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HEAVY CONSTRUCTION EQUIPMENT

Located Downsville, N.Y.

All offered subject to prior sale

- 10—EUCLED Bottom-Dumps Model 43 FDT, 13 c.y.  
1—EUCLED Loader, Model 3 BV, Serial BV 22.  
8—STERLING Model MCS 297 End-Dump Trucks, 12 c.y.  
8—CATERPILLAR Tractor-Dozers, 1 H Series.  
2—ROCK RAKES with LE TOURNEAU Bulldozer Connections.  
3—CATERPILLAR Model 12 Graders.  
1—LIMA Type 1201 3½ c.y. Shovel/Dragline Combination.  
1—LIMA Type 604 1½ c.y. Shovel/Crane Combination.  
1—BUCCYRUS-ERIE 2½ c.y. Shovel/Dragline Combination.  
1—LORAIN T20 ½ c.y. Moto-Crane, Shovel/Crane/Backhoe Combination.  
1—Shovel Front Complete for Bucyrus-Erie 54-B.  
1—Digging Bucket for P&H 1055, 3½ c.y.  
1—Dipper Handle for P&H 1055.  
1—Page Dragline Bucket, 1½ c.y., Type AX.  
1—Owens Clamshell Bucket, ¾ c.y., Type D.  
1—Heltzell Concrete Bucket, 1½ c.y.  
1—Blaw-Knox Concrete Bucket, 1 c.y., Model C-31 KB.  
1—Wiley Concrete Bucket, 1¾ c.y.  
1—REX Model 160 Double Pumpcrete, complete with 7" pipe fittings and assorted specials.  
1—GARDNER-DENVER Grout Pump, Model EF-FS, 10x4x10.  
1—MALSBURY Steam Cleaner, Model 322-OMS17, mounted on GMC 6x6 Truck.  
4—WORTHINGTON 2-Stage Turbine Pumps, Model 12-QG-H2 (2 electric and 2 diesel driven); capacity 1500 GPM @ 110 ft. head, @ 1770 R.P.M.  
GROUP OF 12 ASSORTED PUMPS (Marlow, Carter, Gorman-Rupp, C.H.&E., Worthington, 3" to 6", Centrifugal).  
1—FORD Truck, 16 ft. Platform, Model F8, Serial 8EQ-7341.  
1—INTERNATIONAL Truck, Model LF172, Serial 661, mounted with 1500 gallon oil tank.  
1—INTERNATIONAL Truck, Model L162, Rack Body, Serial 3530, mounted with Lubrication Equipment, Worthington compressor and Wisconsin engine.  
1—BRUNNER Electric Compressor, Model HO78C.  
1—INGERSOLL-RAND Compressor, Model V-253-NS, 5x3x3½.  
1—INGERSOLL-RAND Compressor, Portable 315 c.f.m., Cummins diesel engine HB6.  
1—WESTINGHOUSE Electric Compressor, Model 3 VC.  
1—HOBART Electric Welder, 300 amp. 220/440 V.  
1—WESTINGHOUSE Electric Welder, 300 amp. Model DC-Type RA-220/440/550 V.  
1—P&H Electric Welder, Type WG-301. 60/375 amp. Generator; Chrysler Model IND engine, type 6A-211.

LARGE ASSORTMENT AIR TOOLS (Jackhammers, Paving Breakers, Tampers, Rivet Hammers, Rivet Busters, Impact Wrenches, etc.)

MISCELLANEOUS SMALL EQUIPMENT AND POWER TOOLS (Power Saws, Drills, Sanders, Grinders, Bar Bender, Light Plants, Hydraulic Press, Hydraulic Jacks.)

REPAIR PARTS—Large stocks—for Allis-Chalmers Tractor and Grader, Baker Bulldozer, Bendix-Westinghouse, Budo, Cummins and G.M.C. diesel engine, Caterpillar Tractor, Delco-Remy, Euclid, International Tractor, TD24, International, Dodge and Ford Truck, Gar Wood Hydraulic Hoist, Jaeger Mixer, LeTorneau, Lima Shovel, P&H Shovel, Rex Pumpcrete, Sterling Truck, and others. Also large stock miscellaneous hardware items (bolts, nuts, etc.) Complete lists furnished on request. Will price right for bulk sales.

"GRIZZLY" EARTH PROCESSING PLANTS  
Plant No. 1—designed to produce, 2,600 c.y. per hour of "B" Pervious material.  
Plant No. 2—designed to produce 1,350 c.y. per hour of "A" Impervious material.

BOTH PLANTS NOW COMPLETELY  
DISMANTLED  
Ask for detailed list of components

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## FOR THE PROVERBIAL SONG

- 1 Bucyrus-Erie Hydra Hoe. Model H3 — Good as new.
- 1 Barber-Greene Trencher (vertical type) — 12' cut — completely reconditioned.
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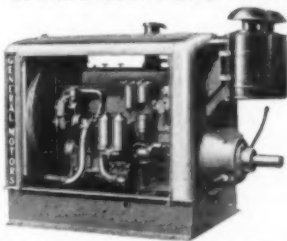
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WE HAVE FOLLOWING EQUIPMENT  
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  - 3 Scrapers, GarWood 25 cu. yd.
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Crane Booms for Buckeye 70 — 3/4 yd. Cranes.  
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50' boom with tagline winder  
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- 2400 Lima Drag, 120', 6 yd.
- 4500 Manitowoc Drag, 140', 4 yd.
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Bargain — Asphalt Plant — 50-70 ton.  
Simplicity spare parts included.

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New, unused Ramrods hard-  
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and female ends. 46" lg.  
Each .....\$1.50

Cat 12 No. 9K-5123 Grader,  
Army .....\$4,000

Link-Belt LS-50½ yard crawler  
with gas motor, 30' boom.  
Army .....\$5,500

Link-Belt YC-9 10-ton yard-  
crane on solid rubber, 20'  
boom .....\$3,000

Cat D-8 with LeT. angle-dozer.  
Army surplus used little, 1200  
hours .....\$7,500

Lima 1201 Crane Boom, unused  
95' and Jib unused...\$2,500

Bay City 180-T50 Truck Crane,  
80' ft. of Boom, 30 ft. of  
Jib .....\$17,000

Loraine MC-4 Motor Crane, Ser.  
No. 13887, 30' boom. Army  
Surplus .....\$13,500

Caterpillar D-6 Ser. No. 10A-426,  
2 yd. Hydraulic Loader. New  
1954. Price .....\$14,000

### Udelson Truck Sales

3210 Woodland • Cleveland, Ohio  
SU 1-1666

## ARMY SURPLUS WINCHES

\$75.00 to \$125.00  
with and without 250 cable

HEIL — GAR WOOD — TULSA  
GMC 270 TRK. MOTORS

\$75.00 to \$150.00  
Excellent Condition  
5-speed Transmission, \$25.00 each

### CHAZEN'S SURPLUS

1721 N. Federal Ph. 450  
MASON CITY, IOWA

CLEARING HOUSE ADS  
BRING RESULTS

## ATTENTION: BUY NOW!!

### TERRIFIC SURPLUS BARGAINS

#### K. O. LEE REAMER DRIVE

##### A NECESSITY FOR YOUR OWN SHOP

A many purpose machine for smooth, easy, efficient operation in reaming of bushings and bearings for such work as piston pins, kingbolts, waterpumps, generators and other machine shop work. Will do the job in the shortest time possible.

Vibrationless at all speeds, holds reamers from ¼" to 1½", has three operating speeds, equipped with special geared transmission, a large 5" self-centering chuck, another ⅝" chuck, a powerful 1/3 H.P. Motor, A.C., 110 Volts, and a foot control switch. Shipping weight 100 lbs.

Approximate List Price — \$250.00.

#### YOUR COST \$65.00

(F.O.B. Canton, Ohio)

5% Cash discount with check in advance or open account to well rated firms.

WRITE — WIRE — OR PHONE:

### WORSIL AUTO PARTS DISTRIBUTING COMPANY

1422 South Market — Canton, Ohio — Phone: GL 3-0144

## TRUCK MIXERS

Jaeger 4½ Yd. Transit Mixer, Serial #J-8367 — At Detroit, U.S. 24 .....\$500.00

Rex 3 Yd. Moto Mixer, Serial #25-166879 (SR-11728) — At Grand Rapids..... 500.00

Ransome 3 Yd. Transit Mixer Serial # 50851 — At Detroit U.S. 24 ..... 500.00

Smith Model 420 — 3 Yd. Transit Mixer Serial #51847 — At Grand Rapids, Mich... 500.00

Smith Model 420 — 3 Yd. Transit Mixer, Serial #51848 — At Grand Rapids, Mich... 500.00

ALL IN GOOD CONDITION

### EARLE EQUIPMENT CO.

2424 - 28th St. S.E.

Grand Rapids, Michigan

Phone Cherry 59247

## FOR SALE

### Northwest Model 25 Pullshovel

28" treads, Caterpillar Model 318  
Diesel Engine, independent high  
speed boom hoist, worm gear  
boom hoist, Serial No. 12395.  
Price .....\$15,000

Rex Model 160 Pumpcrete with 600  
ft. 6" pipeline.

Northwest Model 25 Shovel Attach-  
ment.

### McCLUNG-LOGAN

#### Equipment Co., Inc.

4601 Washington Blvd. Tel. Arbutus 3900  
Baltimore 27, Maryland

## I HAVE FOR SALE

the following: One 300 H.P. L.P.  
Gas Waukesha Power Unit. Com-  
plete with 85 gallon fuel tank and  
Radiator. Can be had with Twin Disc  
Power take off. This Unit is recon-  
ditioned and guaranteed, and can  
be had at a very low figure.

BOX 2841

PENGILLY, MINNESOTA

## Heavy Equipment

### BARGAINS

## LIMA PAYMASTER

GM Diesel engine. Heavy duty rock  
backhoe attachment. Also 50 ft.  
crane boom.

## INSLEY K-12 CRANE

Cat Diesel engine. 30 ft. boom. Also  
backhoe attachment.

### Keaton Construction

#### Company

Jacksonville, Arkansas  
Phone Liberty 4-2271

## ROAD FORMS

### NEW

7"-8"-9"-10"-12"-14"-15". Base Equals Height.

### Frank McCaffrey Equipment Co.

Hird & Williamson Ave., Cleveland 7, Ohio  
Phone: LAkewood 1-3227

### USED QUARRY MACHINERY

5 screens, 2-deck, var. sizes.  
4 feeders, 36" and 42".  
10 belt conveyors, 30" wide.  
2 belt conveyors, 18" and 24" wide.  
2 Symons bar grizzlies.  
3 car pullers.

### TRACTOR & EQUIPMENT CO.

10032 Southwest Highway Oak Lawn, Ill.

# FOR SALE CRUSHING PLANT

BARGAIN

Diamond Portable 15x36 Jaws  
20x24 Rolls — One Unit — Approx. 25 Tons  
Heavy Steel Wheels — Excellent  
Also Several Smaller Plants

**L. H. JONES EQUIP. CO.**

MORGANTOWN, WEST VIRGINIA

Box 927

Phone 21307

## FINE MATERIAL WASHER

PORTABLE — NEW

20' x 18' Single Screw "Eagle"  
Capacity 35 tons per hour.

Equipped with perforated flights, mounted  
on two rubber tires and equipped with a  
towing hitch.

NEW FACTORY COST, \$2,600.00  
(for washer only).

NEW COST OF THE UNIT IS  
\$3,500.00 each.

OUR PRICE \$1,500 ea.

**Contractors Equipment Co.**

903 Jefferson Bldg. — Peoria, Illinois  
Phone 3-9553

## FOR SALE

DW20 Caterpillar Scraper, S/N  
21C649, 1300 hours, 90% rub-  
ber, very good condition. .... \$22,000

DW20 Caterpillar Scraper, S/N  
21C644, New Cat D337F, Tur-  
bo-charged 300 HP engine  
installed, unused, 75% rub-  
ber ..... 25,500

2 DW-21 Cat Scrapers, S/N  
8W81 — 8W86 with new 337F  
Turbo charged engine A-1 con-  
dition, each ..... 27,000

D8 Caterpillar Tractor, S/N BR-  
6807, good condition ..... 4,000

**Soda & Luscher  
Constr. Co.**

1345 Warren Avenue  
Phone Olympic 2-9933  
NILES, OHIO

## FOR SALE

7200 Marion Diesel Dragline, 135', 5 yard.  
2400 Lima Dragline, 130', 5 yard.  
4500 Maintowoc Dragline, 120', 5 yard.  
5W Bucyrus Dragline, 120', 5 yard.  
111A Marion Dragline, 80', 5 yard.  
111-M Marion Shovel, 4 yard.  
1600 P&H Electric 6 yard Shovel.  
1201 Lima Dragline, 85', 3 yard.  
54-B Bucyrus Dragline, 85', 3 yard.  
1001 Lima Dragline, 80', 2½ yard.  
3500 Manitowoc Dragline, 80', 2½ yard.  
1000 Osgood 2½ yard Shovel.  
372 Marion 1¼ yard Shovel.  
58-BH Joy diesel Rotary Drill.  
80-D Northwest 2½ yard Shovel.  
54-B Bucyrus, 2½ yard Shovel.  
42-T Diesel or Electric Drills.  
Euclid trucks.  
Attachments.

**Frank Famalette  
Equipment Co.**

P.O. Box 325  
Hazleton, Pa. GL 5-4708

## Unused Gasoline Power Units WAUKESHA XAH-225-A

Three available—3½" x 4½" — 36  
HP at 1600 RPM — 42 HP at 1800  
RPM. Radiator cooled, with reverse  
gear, sprocket and auxiliary jaw  
clutch.

**THE BOSTON METALS CO.**

313 E. Baltimore Street  
BALTIMORE 2, MD. — LE 9-1900

## FOR SALE

¾ yd. American Crane, equipped with independent boomhoist, 45 ft. boom, fairlead for  
dragline, long wide tracks, extra counterweight. Age: 17 months. Price \$9000.  
Pump, Jaeger 4" double diaphragm on 2-wheel rubber tired trailer. Price: \$350.  
Trailer, 24 ft. flat with high rack sides. Price: \$200.  
Pump, centrifugal 3", electric drive.  
Electric motors, ¾ HP, several.  
Wood blocks, steel blocks, gate and solid, various sizes, cheap.  
Cotter Pins, large quantity, various sizes, in original boxes.

**MILLS CRANE SERVICE & CONST. CO., INC.**

FARMINGDALE, NEW JERSEY

## CLEARING HOUSE SECTION

### FOURTEEN TRANSIT MIXERS

- 2 Jaeger 3 yd. (4¼ yd. Agitator) Hi-Dis-  
charge, 1945-1947 Models, one mounted  
on 6-Wheeler, one un-mounted.
- 1 Smith 3 yd. (4¼ yd. Agitator) Hi-Dis-  
charge, un-mounted.
- 1 Rex 3 yd. (4¼ yd. Agitator) Hi-Discharge,  
mounted IHC "L170" tandem truck.
- 1 Rex 3 yd. (4¼ yd. Agitator) Hi-Discharge,  
unmounted.
- 1 Rex 3½ yd. Hi-Discharge Adjusta-Wate  
Moto-Mixer, un-mounted.
- 8 Rex 5½ yd. Adjusta-Wate Moto-Mixers,  
6 months to 1½ yrs. old, un-mounted.

### SHOVELS & CRANES

- Insley "K-12" ½ yd. Trench Hoe or Drag-  
line (2), 1952 Models.
- Unit "514" ½ yd. Used Trench Hoe.
- Lorain "TL-20" ½ yd. Used Dragline or  
Trench Hoe, Reconditioned.

### MISCELLANEOUS

- Pettibone "15" Used 1½ yd. 4-wheel drive  
Tractor-Shovel.
- Hough "HM" Used 1½ yd. Payloader, Good  
shape.
- Hough "HF" Used ¾ yd. Payloader.
- Caterpillar "D-6" Diesel Tractor w/Hi-Lift  
Cable Traxcavator, 1950 model in fine  
shape.
- Caterpillar "D-6" Diesel Tractor w/Traxca-  
vator. Needs some track repairs.
- Adams "411" Diesel Motor Grader, w/Cab  
& Scarifier.
- Barber-Greene "705" RT Runabout Ditcher,  
serial number 705-49-4. Digs 4¼ ft. deep.
- Universal 2036 R.B. Jaw Crusher on skids  
w/Apron Feeder.
- Universal "1824" Rebuilt R.B. Jaw Crusher  
on skids.
- Gruendler "3XD" Used Portable Pulverizer  
w/Apron Feeder, screen, pulverizer, Cat.  
D8800 Diesel Power, discharge conveyor,  
Low-priced.
- Cedarapids Used Portable Gravel Plant,  
closed circuit, two unit plant; hopper,  
plate feeder, gas power, 1524 jaw, 3x8  
screen, gas engines, pneumatics.
- Burmeister "CB" New Type CB Combina-  
tion Aggregate & Cement Batcher at  
bargain price.
- Bayport 23 yd. New Aggregate Bins. 2 in  
stock.
- Caterpillar "D218" Diesel Electric Generator  
set, 40 KW.

**EIGHMY EQUIPMENT  
COMPANY**

Phone 4-6706  
120 S. Pierpont, ROCKFORD, ILLINOIS

## Manufacturer's Literature

### Spreading Equipment for Ice Control

A new ice control catalog describing the full line of Baughman ice control spreading equipment, has been released by Baughman Mfg. Co., Jerseyville, Ill. Included in the new literature are illustrations and descriptions of truck-mounted spreader bodies, tail gate spreaders, dump body spreaders, pull type spreaders, gravity feed spreaders, and spreaders for use on converted buses.

For more information circle 133 on Service Coupon Page 16 and mail now.

### Motor Scraper

Allis-Chalmers pictorially tells the design, engineering, construction and operating feature stories of its new TS-260 motor scraper in a 16-page 2-color catalog, MS-1105, available from the Construction Machinery Division, Tractor Group, Milwaukee, Wis. In addition to TS-260 specifications, the catalog includes many photographs showing engine, power train, steering, braking and other components which combine to provide dependable operation and performance.

For more information circle 134 on Service Coupon Page 16 and mail now.

### Portable Tandem Rollers

A new bulletin (No. 32) covering its Model 160 3 to 5 ton portable tandem roller has been announced by Littleford Bros., Inc., Box 75, 454 East Pearl St., Cincinnati, O. Outstanding features of the Model 160 that are described and illustrated include: complete power steering by means of a servo-hydraulic system and a powered hydraulic trailing conversion. Information is also available on Littleford's Model 157 2 to 3 ton portable roller, Bulletin 24, and Model 185, 4 to 6 ton portable tandem roller, Bulletin 20.

For more information circle 135 on Service Coupon Page 16 and mail now.

### Trenchers and Backfillers

The complete line of Cleveland trenchers and backfillers including the recently introduced Cleveland L-270 ladder-type trencher, is featured in a new 4-page bulletin (L-101) published by The Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland 17, O. Information on the capacities, specifications and dimensions of the nine Cleveland machines has been organized to facilitate a quick, convenient comparison of the models. Special advantages and Cleveland design and construction features incorporated in each machine are covered.

For more information circle 136 on Service Coupon Page 16 and mail now.

### Multiple Compactor

A new, illustrated bulletin, available from Jackson Vibrators, Inc., Ludington, Mich., demonstrates the many ways in which the six compacting units in the workhead of their multiple compactor may be arranged and rearranged to provide the most efficient coverage and consolidation of granular soils, rock, slag, sand or gravel, as used in sub-bases, bases of macadam pavement, pavement widening, projects and fills of various kinds. As the bulletin points out, the flexibility of the Jackson multiple compactor, which has numerous advantages for the operators of this type of equipment, is derived from the fact that each of the units in the workhead may be independently operated. Hence the working width of the machine, normally 13ft., 3 in., when all units are used in line, may be reduced by any number of units to suit the width of project.

For more information circle 138 on Service Coupon Page 16 and mail now.

### Testing Apparatus for Soils, Cements, Asphalts

The new 128 page catalog available from Soiltest, Inc. 4711 W. North Ave. Chicago 39, Ill., contains descriptions and illustrations of over 1350 items of apparatus for engineering tests of soils, concrete, asphalt and construction materials.

For more information circle 139 on Service Coupon Page 16 and mail now.

**You'll get more SUNSHINE!**  
IN **St. Petersburg** IN **Phoenix**




**The Soreno HOTEL** **ALSONETT HOTELS** **Jokake Inn**

**FLORIDA ARIZONA**

**IN Fort Lauderdale**



**The POINSETTIA BEACH HOTEL**

Mold your vacation to your pleasures at an Alsonett Hotel, famous for courteous service and fine facilities. **JOKAKE INN**, in the "Valley of the Sun," 10 miles east of Phoenix. Typically Southwestern in activities, climate and manners. All resort activities; private pool. Hand picked guests. **THE SORENO**, St. Petersburg, Florida, on beautiful Tampa Bay. Good location, good food, good entertainment. Delightful guest rooms. **POINSETTIA BEACH HOTEL**, Ft. Lauderdale, Florida, "Around the corner from everything." Fine appointments.



## Arrow MOBILE HYDRAULIC HAMMERS ARE VERSATILE

Use ARROW MOBILE HYDRAULIC HAMMERS to drive shoring—posts—piling. Use them to break all types of paving—to cut asphalt—to compact trench backfills. You'll save money and do a better job in less time. ARROW MOBILE HYDRAULIC HAMMERS can be fitted with a wide variety of tools for special jobs. Exclusive creeper drive, with foot-controlled start and stop, is just one of the many money-making extras ARROW gives you. Get ALL the facts—learn why you get more for your money in ARROW MOBILE HYDRAULIC HAMMERS.

Write, Wire or Phone for complete information.  
**ARROW MANUFACTURING COMPANY**  
194 WEST DAKOTA AVE. DENVER, COLORADO

... for more details circle 181, page 16



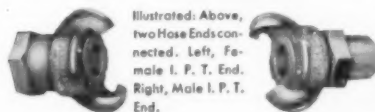
*Quick Action...and  
Tight, Pressure -  
Proof Connections*



## "AIR KING" Quick-Acting Universal HOSE COUPLING

**FOR COMPRESSORS, ALL TYPES  
OF AIR TOOLS, WATER, OIL  
AND SPRAY SERVICE**

This versatile coupling is built along plain, rugged lines to assure long, trouble-free service under severest working conditions.



The "Air King" will reduce operating costs wherever quick connections are required. Locking heads are identical for all sizes of hose or threaded ends within the coupling's size range, and are locked by pressing together and applying a quarter-turn. Equipped with patented Safety Locking Device. Bronze or rustproofed malleable iron, in sizes up to 1".

Stocked by Manufacturers and Distributors  
of Industrial Rubber Products

**DIXON**  
*Valve & Coupling Co.*

GENERAL OFFICES & FACTORY—PHILADELPHIA 22, PA.  
BRANCHES—CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON  
DIXON VALVE & COUPLING CO. LTD. · TORONTO Associate Companies  
Rockwell Company, Inc., Garyville, Pa. · Precision Steel Die Company, Canada, N.Y.

... for more details circle 199, page 16

**ROADS AND STREETS, October, 1956**

## With the Manufacturers and Distributors

**THREE NEW LITTLEFORD DEALERS.** Three new dealers to handle its complete line of road maintenance equipment have been announced by Littleford Bros., Inc., Cincinnati, Ohio. They are: The Roy Klossner Co., San Antonio, Texas; The Farley Equipment Co., River Grove (Chicago), Ill. and A. Pickard Machinery Ltd., Charlottetown, Prince Edward Island, Canada.

**IOWA MFG. ADDS NEW DISTRICT SALES REPRESENTATIVE.** Iowa Manufacturing Co., Cedar Rapids, Iowa, has appointed Fred Dolton district sales representative for the Cedar Rapids line of aggregate producing and bituminous mixing equipment. His territory will include the New England States and Metropolitan New York.

**CHALLENGE MFG. CO. PURCHASES HELLER.** Challenge Manufacturing Co., Los Angeles, Calif., and Bryan, O., has purchased the Heller Mfg. Corp., Los Angeles, Calif. Production of the "Universal Trencher" previously manufactured by Heller, has been greatly increased by Challenge Mfg. Co. in order to fill delivery schedules more promptly.

**GOUGH APPOINTED SALES MANAGER.** Percy S. Gough, heretofore manager of distribution for American Hoist and Derrick Co., St. Paul, Minn., has been appointed sales manager for the Crosby-Laughlin Division of the company.

**BRANNIAN APPOINTED EUCLID SALES REPRESENTATIVE.** L. H. "Rip" Brannian has been appointed district sales representative in the Central Region for Euclid Division, General Motors Corporation, Cleveland, Ohio. He will cover North and South Dakota and Manitoba, Canada, with headquarters in Fargo, N. Dak.

**APPOINTMENTS FOR LITTLEFORD RESEARCH CENTER.** Littleford Bros., Inc., Cincinnati, Ohio, has announced two appointments to the staff of its new research and development center for black top road construction and maintenance equipment. William T. Camm formerly, Littleford plant and industrial engineer, has become chief of the design and development department. T. J. Grueter becomes design and development engineer.

**GERHARD TO MANAGE WEST COAST SUBSIDIARY.** Irvin L. Gebhard has been appointed general manager of Koehring Co. of California, subsidiary of Koehring Co., Milwaukee, Wis. In his new post, Gebhard succeeds Harry R. Powers, who, earlier this year, was named district representative for the firm's Northwest territory.

**PERSONNEL CHANGES IN WAUSAU IRON WORKS.** As part of the company's current expansion program, R. J. Heinzen, President of Wausau Iron Works, has an-

Ask the man behind the gun . . .

**White gives you  
everything you want  
in an engineer's  
transit**



Shown, model 7014 with "A" Standard. "U" type also available. \$675.00 complete with tripod case and field equipment.

**WHY** are more and more engineers and builders choosing White Engineers' Transits? Basically, the reason is simple: White transits are designed and built for the man in the field. They incorporate all the work-saving, accuracy-boosting features . . . the rugged construction . . . the simplified quality components that you want. In addition, you get coated optics, covered leveling screws and internal focusing Telescope. Wide frame tripod is optional.

**YOUR CHOICE OF THREE RETICLES  
AS SHOWN BELOW —**



Fig. I  
Cross hair  
arrangement for  
our standard  
levels.



Fig. II  
Stadia hair  
arrangement for  
our standard  
transits.



Fig. III  
Special stadia  
hair arrangement,  
furnished  
upon request.

To get the details on the complete White line of instruments for Engineers, Surveyors and Builders, write for Bulletin 1056, DAVID WHITE COMPANY, 325W. Court Street, Milwaukee 12, Wisconsin.



We offer  
the most expert  
REPAIR SERVICE  
on all makes,  
all types of  
instruments

\*Prices subject to  
change without notice.

... for more details circle 270, page 16

**139**

## Handiest Locations in PITTSBURGH

**Hotel Pittsburgher**  
PITTSBURGH, PA.  
Diamond St. below Grant



**Right in the heart of the Golden Triangle—Hotel Pittsburgher**

400 outside rooms with bath. Large-screen television and radio at no extra charge in every room. Air conditioning. Finest dining room. A *Tlantic* 1-6970.

### Hotel Pittsburgher MOTEL

Opposite Greater Pittsburgh Airport on Airport Parkway west. 96 air-conditioned rooms with large-screen television at no extra charge. Tile bath. Private phone. Restaurant facilities. Courtesy car to and from airport.

AMherst 4-5152

*a Knott Hotel*

JOSEPH F. DUDDY, GEN. MGR.

nounced the following personnel changes within the organization: N. R. Gahnz, general sales manager; Russell W. Theisen, assistant sales manager; W. F. Bliese, comptroller and H. J. Lella, purchasing agent.

**MANWARING PROMOTED BY INTERNATIONAL HARVESTER.** International Harvester Co., Chicago, Ill., has named Howard S. Manwaring, assistant director of engineering since 1953, to the position of director of engineering.

**WEHDE JOINS FWD.** Louis A. Wehde has joined the Four Wheel Drive Auto Company staff as assistant sales manager. Wehde formerly was midwest zone manager for Dodge Bros. Corporation and also has been a zone manager for Hudson Motor Car Co.

**FAIN APPOINTED ADVERTISING SUPERVISOR.** Stan Fain has been appointed advertising supervisor for R. G. LeTourneau, Inc., Longview, Texas, and will be responsible for magazine space advertising, direct mail, promotional literature, and coordination of the advertising division's production activities.

**PIONEER NAMES SALES PROMOTION MANAGER.** Fred W. Hartlage has been appointed sales promotion manager for Pioneer Engineering Works, Inc., Minneapolis, Minn., a subsidiary of Poor & Company, Chicago. Hartlage was formerly an account executive with the Alfred Colle Advertising Agency and advertising and sales promotion manager with the Baker-Lull Corporation.

## Vacation In CHICAGO



### HOTEL SOUTHMOOR

*Located across from the  
Museum of Science and Industry*

Visit 8 acres of exhibits at world-famous Museum of Science and Industry. Facing Jackson Park — noted for its gardens, lagoons, yacht harbor and 18-hole golf course. Within walking distance of beaches, riding, tennis.

Near Sox Park — Home of the Chicago White Sox.  
15 minute drive from Loop.

600 modern rooms with bath. Excellent Coffee Shop. Cocktail Lounge. Garage.

Moderate Rates.

**From \$5 Single \$7 Double**

Family Rates and Special Group Rates.

William F. Huff, Gen. Mgr.

Stony Island at Sixty Seventh

**CHICAGO**

## WHAT ABOUT YOU, MR. READER?

Are you still active in the field? Have you moved or changed your position?

Unless you send this information directly to us we can't be sure. Sometimes a reader's name is cut from the mailing list because we are not sure that our information as to name, title and address is right. *Your* name might be cut from the mailing list.

### Don't Let This Happen to You

Even if you think we know all about you, please fill in the information requested below and send to us by return mail. Our auditors require proof of accuracy of our mailing list. *You* are the only person who can help us on this. Do it now before you forget, so you can be sure your magazine will always be properly addressed to you. New names cannot be added or old names retained on our list unless we have *all* this information. *Please print or type.*

#### ROADS AND STREETS

22 WEST MAPLE STREET, CHICAGO 10, ILL.

- ☐ I do receive **ROADS & STREETS** and wish to continue to receive it.  
☐ I do not receive **ROADS & STREETS** but would like to have it.

DATE \_\_\_\_\_

NAME \_\_\_\_\_

TITLE OR OCCUPATION \_\_\_\_\_

FIRM NAME OR GOVERNMENT DEPARTMENT (give street address) \_\_\_\_\_

CITY  
(If you have moved give old and new address)

ZONE (if any)

STATE

SIGNATURE \_\_\_\_\_

**McGLONE ELECTED VICE-PRESIDENT.** John J. McGlone was elected vice-president of the Williams Bucket Division of The Wellman Engineering Co., Cleveland, Ohio. Mr. McGlone, who is also general manager of the Williams Bucket Division, joined Wellman in March, 1955.

**McKINNEY JOINS HYSTER.** Sam D. McKinney, formerly with the Portland Oregonian, Hollis Goodrich & Associates, and a former staff member of the Lumbermen's Industrial Relations Committee, has joined the Sales Promotion Department of Hyster Co., Portland, Ore.

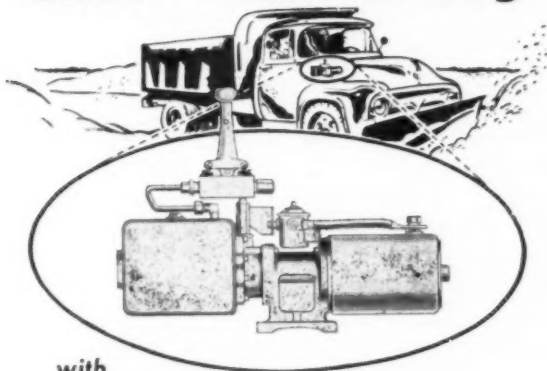
**McCOY GOES TO WEST COAST FOR CATERPILLAR.** William E. McCoy, heretofore eastern sales manager for Caterpillar Tractor Co., Peoria, Ill., has been appointed sales manager of Caterpillar's southwest division with headquarters in San Francisco. He succeeds Bernard L. Hagghund who died May 12.

**SWALLEY JOINS F. D. CUMMER & SON.** William C. Swalley, 25-year veteran vice-president and former general sales manager of Wellman Engineering Co. has resigned to become president of F. D. Cummer & Son Co., Cleveland, Ohio. R. N. Birdsall, Cummer's general manager and chief engineer, has been elevated to the additional post of vice-president.

**WETZEL NEW MANAGER ATLAS EASTERN OFFICE.** James L. Wetzel has been appointed manager of Eastern District explosives sales office of Atlas Powder Co., Wilmington, Del. His headquarters will be in the company's general offices in Wilmington. Mr. Wetzel, manager of Atlas' explosives sales office in Pittsburgh, Pa., since 1951, is succeeded in that post by John K. O'Hare, special representative in the office.

**AUSTIN-WESTERN PROMOTIONS.** J. Arthur Fitzens has been appointed manager in charge of domestic sales of the products of Austin-Western Works, Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Aurora, Ill. A. Merrill Smith has been appointed assistant sales manager. Mr. Fitzens has served Austin-Western for 22 years in various capacities, including those of central district manager and assistant sales manager.

## Fast-Automatic Snow Plow Lifting



with

### MONARCH DYNA-MIGHT POWER HYDRAULIC CONTROLS

Fan Belt or Electric models available for practically all makes of trucks. See your dealer or write for full details.

**MONARCH**

ROAD MACHINERY COMPANY

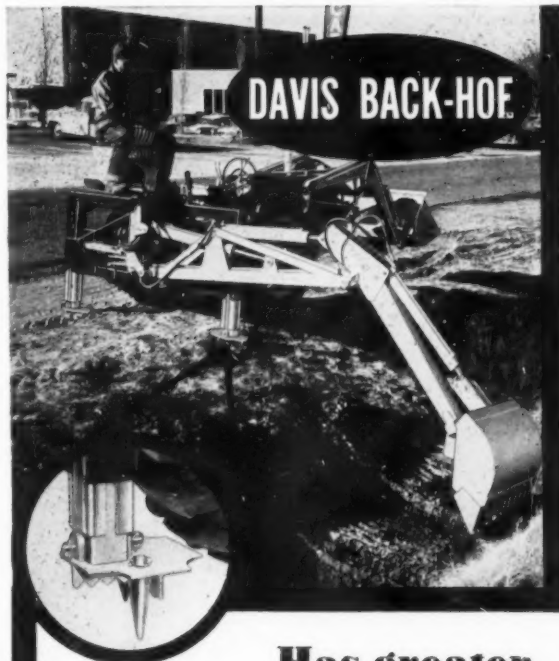
1331 Michigan St., N.E.

Grand Rapids 3, Michigan



... for more details circle 245, page 16

ROADS AND STREETS, October, 1956



## Has greater utility...extra stability

You can do dozens of jobs with the Davis Back-hoe that you can't with any other back-hoe. Cleaning ditches is just one of them! That's because the Davis operates to the side as well as to the rear, and doesn't require room to stretch out. Two individually controlled hydraulic stabilizer feet in the extra wide frame make it virtually impossible to turn over, and let you level up on slopes. Comfort and visibility are tops. You always face your work without twisting, and you can always see where you're digging. It can be detached or attached to the Davis Loader in less than five minutes. Priced lower than the average. Highest quality unit available. Compare it, and you'll agree.

## DAVIS LOADER LEADS THE WAY

The running mate to the Davis Back-hoe is this powerful Davis Loader. It has maximum strength, speedy action, streamlined design for maximum clearance and visibility. Quality built, yet reasonably priced. Many attachments. Available for most tractors.



SOLD AND SERVICED NATIONWIDE BY BETTER DEALERS

Mid-Western Industries, Inc.

1009 South West Street  
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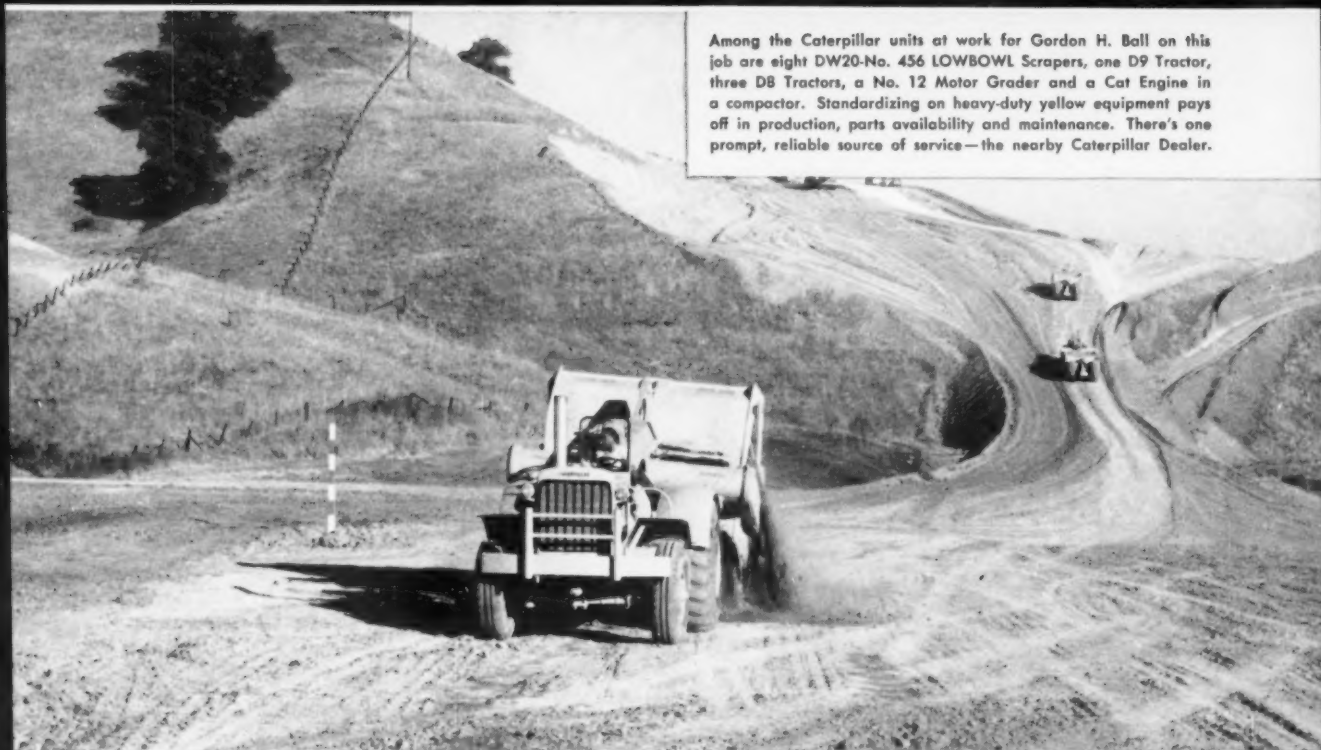
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Working on the construction of a 2.6-mile bypass near Lafayette, California, Gordon H. Ball has eight new four-wheel Cat DW20-No. 456 LOWBOWL Scrapers handling the job, estimated at 1,500,000 cu. yd. The material is sandstone clay. Mr. Ball, whose company has used Caterpillar equipment for 35 years, is more than satisfied with the production of the LOWBOWL units. They are moving about 10,000 cu. yd. in an eight-hour day.

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